UNIVERSITY

Of

GLASGOW

Educational Beliefs Development with Pre- and In-Service Teachers Using Perry's Model: A Cross-Cultural Study

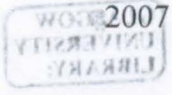
by

Mona Mohammed Fouad El-Sawaf

B.Ed., Special Diploma in Education

A thesis submitted in fulfilment of the requirements
for the degree of Doctor of Philosophy.

Centre for Science Education
Educational Studies
Faculty of Education
University of Glasgow



قُلْ هَلْ نُنَبِّئُكُم بِٱلْأَخْسَرِينَ أَعْمَـٰلًا ﴿١٠٣﴾ ٱلَّذِينَ ضَلَّ سَعْيُهُمْ
فِى ٱلْحَيَوٰةِ ٱلدُّنْيَا وَهُمْ يَحْسَبُونَ أَنَّهُمْ يُحْسِنُونَ صُنْعًا ﴿١٠٤﴾

[سورة الكهف: ١٨ (١٠٣ ، ١٠٤)]

In the name of Allah, Most Gracious, Most Merciful

"Shall we tell you of those who lose most in respect of their deeds? Those whose effort goes astray in this life, while they thought that they were acquiring good by their works?"

[Surat Al Kahf 18: (103, 104)]

Dedicated to my beloved husband ***Ayman Hassan El Alfy,***

For his endless love and support,

For his astonishing kindness and patience,

Without him this thesis would not have been possible.

Also dedicated to my little princesses, the joy of our life, ***Roaa*** and ***Hana.***

Abstract

In change implementation, there is a strong belief that teachers are important agents of reform. Paradoxically, however, teachers are also viewed as the major inhibitors to educational change. Many research studies have suggested that teachers' beliefs are outdated, rooted in an old educational system and are difficult to change.

Contrary to the prevailing thinking about beliefs change, Perry (1970), in his model of "Intellectual and Ethical Development", described structural cognitive and ethical changes that take place during students' experiences in university education. The research reported here used Johnstone's (1998) adaptation of Perry's (1970) scheme of "Intellectual and Ethical Development" to investigate pre- and in-service teachers' belief change, to examine whether teachers' beliefs are rooted in a Victorian system and whether they are facilitators or inhibitors of educational change?

Using quantitative and qualitative approaches, the current study traced the development of the beliefs of cross sectional groups of pre- and in-service teachers, identified the factors and the influences that in-service teachers perceived to be of great effect on changing their belief profiles and uncovered teachers' perceptions of what could be the leverage points of educational change. These examinations were conducted in two cultural settings: Egypt and Scotland.

Findings confirmed that the beliefs of pre- and in-service teachers do change over time. These changes followed various patterns. In some groups, the change identified contradicted the change anticipated by Perry in his model. Furthermore, major contextual barriers to belief change and interpretation have been identified. Despite the collective effect of these barriers, teachers singled out current curriculum and assessment frameworks as the greatest barriers to changing beliefs and practices.

Recommendations include a process of personal and systemic change as a means to achieve the paradigm shift necessary to develop the beliefs in accord with 21st century education reform; provision of specifically designed teacher education programmes and the development of professional development modules.

Acknowledgment

Writing the acknowledgment marks for me 'the closure' of a journey that has been for almost four years. It is a journey of a dream that I had been longing for as far back as I can remember. The dream to travel and study abroad was compounded of many motives. The striving force to learn more, the sheer curiosity to find out how far I can go to know more about my potentialities, the strong desire to put myself through incongruities, dissonances, and anomalies of experiences that would ultimately develop the person I am and bring out the mature and wise person I always aspire to be. I came here searching for answers to so many of my questions. I am going home, not with the answers, but with heaps more of many other questions and the precious realisation that the answer lies in the questioning and the journey to find out about those answers: that is what creates meaning and defines self and life.

Despite all the questioning, what was beyond question is my deep heartfelt gratitude to all those who lived the dream with me and made it possible. Of all, I would like to thank my beloved husband for being the person he is, for proving to me everyday that having him as a husband and as a loving father is a blessing from Allah to which I am forever thankful. He gave me the courage to face adversity and the freedom to explore my own horizons even if the expenses were putting his academic future and career on hold to look after our kids and me for four years. My deep love and appreciation go to Roaa and Hana, my cheering angels, who patiently have given up so much of their mum's time and attention for this work to be completed. The strength of our love for each other carried us through all the hard time and our love has grown stronger.

I would also like to thank Prof. Norman Reid for supervising my work and for giving me the opportunity to learn in a place he made home for three years. I am grateful for his considerable expertise, his understanding, guidance, support, encouragement and for being the father when I desperately needed one. He, of all I met, is unique in his strong belief in his students, in his dedication to his work, to research, to the Centre for Science Education, and definitely in his non-judgemental and unconditioned positive regard to all people. His relentless efforts to offer them the best he can to get out the best in them sets an example to be followed.

I would like also to express my deep gratefulness for Chris Smith, my co-supervisor and my dear friend. It has been an absolute pleasure to work with her. She has created the ideal image for how supervision should be like. With her superb intellectual and ethical commitments, she sets standards that are quite hard to beat. Her critical questions and constructive feedback all along were windows of opportunities that challenged my thinking and helped me find tune and sharpen my thoughts. I am thankful for the enjoyable and insightful conversations we had.

Of all the positive experiences I had throughout this journey, the highlight was meeting Prof. Rex Whitehead. I am grateful for having the opportunities to share with him his harvest of decades of involvement in thinking and learning. His rich granary of knowledge

in science, religion, literature, language, culture and relationships was wonderful to share. I can hardly remember asking him a question to which he knew no answer. I am going to miss him with his pipe and ashy tips of fingers; his cup of tea with few drops of milk and definitely the wise and thought provoking deeply challenging revelations we had in our conversations.

I would like to extend my deep gratefulness to the following very special Marwa El Sawaf, and Sawsan Abd Al-Rahman, for their support and assistance all through the PhD experience. Their care, love and friendship are most appreciated. Even more precious is their constant efforts to make sure that I know that they care. My thanks go also for the intimate friends I made here, for Ira Papageorgiou, Huda Hindal, Shahabuddin Hashim as well as all my friends in the Faculty of Education for the precious moments and memories we shared.

My sincere appreciation go to my family and the family of my husband for their endless support, for their constant prayers and for making home where they are. Of them all, I would like to mention the late Mr. Hassan El Alfy and the late Mr. Yousry El Sawaf who managed to get us through many of the difficulties we faced to come here. It is sad that we will not be able to be reunited again to celebrate the hard work we have done not to let them down and it is heart breaking that we never had the chance to bid them the last farewell.

Special thanks also go to the staff members of the psychology department at Women's Faculty of Art, Science and Education in Ain shams University. They formed a supportive network of quite efficient advisors and helpful colleagues and friends. Particular in that respect are the wonderful, most appreciated and respected Prof. Safaa Al Asar and Prof. Aziza Al Sayed for their support and thoughtfulness.

I should like to thank Prof. Alaa Al Gendy and all the staff working in The Egyptian Cultural and Educational Bureau in London for their effective and most helpful management for this Egyptian-government sponsored study.

The student teachers and teachers deserve a special acknowledgment for their willingness to participate in this study and trusting me with their voices, thoughts and opinions.

I am indebted to all of those who have made the journey possible, enjoyable and enabled me to turn the greatest dream of my life – so far – into reality.

Table of Contents

	Page
Chapter One	1
Introduction	1
1.1 Rationale for the Study	1
1.2 Aims and Objectives	3
1.3 Importance of the Study	4
1.4 Thesis Structure	6
Chapter Two	7
Paradigm of Thinking	7
2.1 Introduction	7
2.2 Kuhn's Theory from Science to Social Science and Humanities	7
2.3 Defining a Paradigm, a Paradigm Shift and a Paradigm's Make Up	9
2.3.1 What is a Paradigm?	9
2.3.2 What is a Paradigm Shift?	9
2.3.3 A Paradigm and its Make Up	10
2.4 Emerging Worldviews and Paradigms	11
2.4.1 Three Worldviews: Perceptual Orientations on Learning and Teaching...	12
2.4.2 General Assumption about Teachers' Epistemological Worldviews	16
2.5 Society and Education of the Industrial Era	18
2.5.1 Psychological Theories Underpinning the Industrial Era Worldview	20
2.6 Society and Education of the Information Age: A Co-evolution	22
2.6.1 Current Paradigm Crisis	23
2.6.2 Psychological Theories Underpinning the Information Era Worldview...	24
2.6.3 Transitions from Behaviourism to Constructivism: A Dichotomy of 'either or' or may be 'both and'	28
2.7 Conclusion	30
Chapter Three	31
Beliefs about Teaching and Learning to Teach	31
3.1 Introduction	31
3.2 Defining Personal Epistemology	32
3.2.1 Nature or Form of the Construct of Personal Epistemology	33
3.2.2 Contents of Personal Epistemology	34
3.2.3 Components of Personal Epistemology	35
3.3 Beliefs about Learning to Teach and Teaching	37
3.3.1 Defining Beliefs	37
3.3.2 Beliefs as Distinguished from Attitudes and Knowledge	38
3.3.3 The Importance of Beliefs in Learning to Teach and Teaching	46
3.3.4 The Formation of Beliefs: Where Beliefs Come From	47
3.3.5 The Nature and Mechanism of Belief Change	52
3.3.6 Research on Pre- and In-Service Teachers' Belief Change	54
3.3.7 Beliefs and Classroom Practices	57
3.4 Conclusion	59

Chapter Four 60
Paradigms of Teaching 60

4.1 Introduction 60
4.2 Educational Beliefs and Instructional Approaches 60
4.2.1 Caine and Caine's Instructional Approaches 60
4.2.2 Pratt's Teaching Perspectives 63
4.2.3 Reinsmith's Archetypes of Teaching 64
4.3 Synthesis 67
4.4 Conclusion 68

Chapter Five 69
Models of Students' Cognitive Development 69

5.1 Introduction 69
5.2 Student Developmental Theories 69
5.3 Cognitive Development Theories: Between Perry and Piaget 72
5.3.1 Structure 72
5.3.2 Assimilation and Accommodation 72
5.3.3 Interaction and Equilibrium 73
5.3.4 Cognitive Stages 75
5.3.5 Irregularities 76
5.4 Review of Perry's Scheme 78
5.4.1 Overview 78
5.4.2 Perry's Original Study 82
5.4.3 Clarifications and Refinements of the Perry Scheme 87
5.4.4 Conceptualisation and Adaptations of the Scheme 89
5.4.5 Assessing Students' Development Using the Perry Scheme 95
5.5 Conclusion 98

Chapter Six 100
Research Methods: Phase One 100

6.1 Introduction 100
6.2 The Aim of the Study 101
6.3 Study Instruments 102
6.3.1 Development of the Instrument Dimensions 102
6.3.2 The Construction of the Instrument's Items 103
6.3.3 Instrument Content Validity and Reliability 120
6.4 Study Sample 125
6.5 Administration of the Instrument 126
6.6 Statistics Procedures Employed in Data Analysis 128
6.7 Elaborations on Data Presentation 134

Chapter Seven 137
Data Analysis of the Egyptian Sample: Phase One 137

7.1 Introduction 137
7.2 Beliefs about the Nature of Ability 138
7.3 Beliefs about the Nature of Knowledge 141
7.4 Beliefs about the Role of Peers 145

7.5 Beliefs about the Nature of Assessment 148
7.6 Beliefs about the Role of the Learner 152
7.7 Beliefs about the Role of the Teacher 156
7.8 Conclusion 159

Chapter Eight 161
Data Analysis of the Scottish Sample: Phase One 161

8.1 Introduction 161
8.2 Beliefs about the Nature of Ability 161
8.3 Beliefs about the Nature of Knowledge 164
8.4 Beliefs about the Role of Peers 167
8.5 Beliefs about the Nature of Assessment 170
8.6 Beliefs about the Role of the Learner 173
8.7 Beliefs about the Role of the Teacher 176
8.8 Conclusion 179

Chapter Nine 181
Discussion and Follow-Up Investigations: Phase One 181

9.1 Introduction 181
9.2 Undergraduates' Beliefs 181
9.2.1 Group Discussions with the Egyptian Undergraduates 183
9.2.2 Interviews with the Scottish Undergraduates 185
9.2.3 Possible Interpretations 186
9.3 Postgraduates' Beliefs 188
9.4 Teachers' Beliefs 189
9.5 Cultural Generalisability of the Development of Beliefs 190
9.6 Issues for Discussion 191
9.7 Conclusion 192

Chapter Ten 194
Research Methodology and Methods: Phase One 194

10.1 Introduction 194
10.2 Results and Data Interpretation 194
10.3 Research Approach of the Study 194
10.3.1 Qualitative and Quantitative Research: The Methodologies 195
10.3.2 Qualitative and Quantitative Research: The Methods 196
10.3.3 Paradigm Wars of Quantitative and Qualitative Research 198
10.3.4 The End of Paradigm Wars and the Emergence of Mixed Research 201
10.3.5 Mixed Research: The Current State of Affairs 204
10.3.6 Mixed Research as the Methodological Stance of the Current Study 206
10.4 Research Methods: Phase Two 210
10.5 Types of Qualitative Interviews 212
10.6 Pitfalls of Using Qualitative Interviews 216
10.7 Interview Schedule 217
10.8 Study Sample 218
10.9 Interview Analysis 219
10.10 Presenting the Results 228
10.11 The Current Data Analysis Approach and the 'Ground Theory' 229
10.12 Conclusion 230

Chapter Eleven 231
Egyptian teachers' Interviews: Phase Two 231
Data Interpretation and Discussion of Findings 231

11.1 Introduction .....
11.2 Results and Data Interpretation 231
11.2.1 Identification of Perry's Positions in the Interviewed Teachers 232
11.2.2 Teachers' Perceptions of the Underpinning Reasons Behind 'Perry A and B' Thinking Preferences 236
11.3 Discussion 256
11.4 Conclusion 266

Chapter Twelve 267
Teachers' Perceptions of Educational Change: Phase Three 267

12.1 Introduction 267
12.2 Study Instrument 267
12.2.1 The Construction of the Instrument's Dimensions and Items 267
12.2.2 Instrument Content Validity and Reliability 267
12.2.3 Instrument Description 268
12.3 Study Sample 269
12.4 Administration of the Instrument 269
12.5 Statistics Procedures Employed in Data Analysis 269
12.6 Elaborations on Data Presentation 269
12.7 Results 270
12.8 Discussion 281
12.9 Conclusion 290

Chapter Thirteen 291
Summary, Major Findings and Recommendations 291

13.1 Introduction 291
13.2 Major Findings 291
13.2.1 Beliefs Do Change: They Regress and Develop 292
13.2.2 Factors Affecting Belief Change 294
13.2.3 Beliefs Affect Teachers' Teaching Approaches and Practices 295
13.2.4 Levers of Educational Change 296
13.2.5 Bringing it Together: Ways of Breaking the Cycle of 'Perry A' Beliefs 297
13.3 The Journey Outlined: From Where to Where 301
13.4 Recommendations for Educational Practice 302
13.4.1 Policy Making and the Educational System 302
13.4.2 Teacher Education Programs (ITE) and Continuous Professional Development Modules (CPD) 303
13.5 Recommendations for Educational Research 305
13.5.1 Further Research Arising from the Limitation of this Study 305
13.5.2 Further Research Recommendations 306
Bibliography 308
Appendices 358

List of Figures

Page

Chapter Two

Figure 2.1 A Paradigm's Make Up: Ontology, Epistemology and Methodology 10

Figure 2.2 The Evolving Sophistication in an Understanding of Teaching 18

Figure 2.3 Behaviourist Learning Theory 20

Figure 2.4 Cognitive Constructivism Learning Theory 25

Figure 2.5 Social Constructivism Learning Theory 26

Chapter Three

Figure 3.1 The Relationship among Knowledge, Beliefs, Attitudes and Worldviews 46

Figure 3.2 Information Processing Model of the Formation of Beliefs 52

Chapter Ten

Figure 10.1 Deducative and Inductive Approaches to the Relationship between Theory and Research 196

Figure 10.2 The Three Major Research Paradigms, Including Subtypes of Mixed Research 207

Figure 10.3 Mixed Methods Research as has been Employed in the Current Study 208

Figure 10.4 Interview Structures 213

Figure 10.5 A Summary of the Interview Analysis Phases 220

Figure 10.6 Data Reduction and Analysis 225

Figure 10.7 Elements Interacting to Generate Meaning of the Interviews 227

Chapter Eleven

Figure 11.1 Interviews Emergent Themes and Categories 236

Figure 11.2 The Teachers' Perceived Hierarchy of the Educational System 257

Figure 11.3 Conceptualisations for Educational Change 264

Figure 11.4 An Interconnected, Dynamic, Complex Open Model for the Educational System 265

Chapter Twelve

Figure 12.1 An Interconnected, Dynamic, Complex Open Model for the Educational System Revisited 286

List of Tables

Page

Chapter Two

Table 2.1 Examples of Paradigms Identified in the Literature 11

Table 2.2 A Comparison of Beliefs across Three Worldviews 15-16

Table 2.3 A Comparison between Traditional and Constructivist Classrooms .. 27-28

Chapter Five

Table 5.1 Scheme of Cognitive and Ethical Development 79-80

Table 5.2 Perry's Scheme in Four Categories 88

Table 5.3 Johnstone's Adaptation of the Perry Scheme 88

Table 5.4 Johnstone's Simplification of Perry's Scheme 89

Table 5.5 Description of Knowledge at each of the Stages of Epistemological Development Based on the Theories of Common et al., Perry, Belenky et al., Baxter Magolda, King and Kitchener and West 94-95

Chapter Six

Table 6.1 An Example of Osgood's Semantic Differential Technique 109

Table 6.2 The Distribution of all the Sampled Groups in the Egyptian and Scottish Contexts 125

Table 6.3 The Distribution of the Scottish Undergraduate Sample according to Gender and Year 126

Table 6.4 The Distribution of the Scottish Postgraduate Sample according to Gender and Degree 126

Table 6.5 An Example of How the Osgood Statements of the Questionnaire are Structured 134

Table 6.6 An Example of How the Likert Statements of the Questionnaire are Structured 135

Table 6.7 An Example of How Data is Presented in the Experiment 135

Chapter Seven

Table 7.1 Egyptian Sample Sizes 137

Chapter Eight

Table 8.1 Scottish Sample Sizes 161

Chapter Ten

Table 10.1 Fundamental Differences between Qualitative and Quantitative Research Strategies 196

Table 10.2 Some Contrasts between Qualitative and Quantitative Research 197

Table 10.3 Comparisons of the Three Paradigms 203-204

Table 10.4 Number of Interviewed Teachers 219

Table 10.5 The Codes Assigned for the Interviewed Teachers 228

Chapter Eleven

Table 11.1 Interviewed Teachers' Perry Thinking Positions 231

Chapter Twelve

Table 12.1 Number of Surveyed Teachers 269

Table 12.2 An Example of How Data is Presented in the Experiment 269

List of Appendices

Chapter 1

Appendix 1.1	An Outline of the Structure of the Egyptian Educational System	359
Appendix 1.2	An Outline of the Structure of the Scottish Educational System	360

Chapter 3

Appendix 3.1	Components from Existing Models of Epistemological Beliefs and Thinking	361
Appendix 3.2	Pajares' Synthesis of the Literature Review on Beliefs	363

Chapter 5

Appendix 5.1	Comparison of the Various Models of Epistemological Beliefs and Thinking	365

Chapter 6

Appendix 6.1	Teaching and Learning Questionnaire (Student's English Version)	366
Appendix 6.2	Teaching and Learning Questionnaire (Teacher's English Version)	368
Appendix 6.3	Teaching and Learning Questionnaire (Student's Arabic Version)	370
Appendix 6.4	Teaching and Learning Questionnaire (Teacher's Arabic Version)	372
Appendix 6.5	Letter from the Center for Science Education	374
Appendix 6.6	The Letter of Approval from Women's Faculty for Art, Science and Education, Ain Shams University	375
Appendix 6.7	Chi-Square Test (χ^2)	376

Chapter 9

Appendix 9.1	Undergraduates' Interview Schedule	379

Chapter 10

Appendix 10.1	The Interview Schedule of the Egyptian Teachers	380

Chapter 11

Appendix 11.1 Background to the Egyptian Educational System 382
Appendix 11.2 The Vision of Pre-University Education in Egypt 386

Chapter 12

Appendix 12.1 Thinking, Learning and Teaching Questionnaire (English Version) 387
Appendix 12.2 Thinking, Learning and Teaching Questionnaire (Arabic Version) 389

Chapter One

Introduction

1.1 Rationale for the Study

UNESCO (2005) states that the future of education is a worldwide pressing concern. With the increasing information growth, fast-paced change and the evolving technological advances that characterise the current century, the critical need for educational reformation (i.e. changes intended to bring improvement) to accommodate current advances and challenges is strongly emphasised.

Education is in the midst of a major paradigmatic shift where multiple reforms and many changes are taking place to create educational reform. The ferment of most current reform efforts is grounded in social constructivist epistemology that is based on the contextualist ontology as a way of perceiving the world. In its essence, it is quite different from the predominant objectivist view that is based on the realist ontology often implicit in the direct traditional modes of instruction.

Being engaged in the process of change for many decades, Fullan (1993) – after reviewing instances of innovations from the 1960's and onward for more than 30 years – concluded, "... we have been fighting an uphill battle. For the past thirty years we have been trying to up the ante in getting the latest innovations and policies into place... It was assumed, but not planned for, that something was bound to come of it. We have never really recovered from the profound disappointment experienced when our expectations turned out to be so far removed from the realities of implementation" (p. 1). Fullan's view that there is slight evidence of the current changes in the reality of classrooms and schools has been supported by many research studies and reports (Caine & Caine, 1997a, 1997c; Carroll, 2005; Haney & McArthur, 2002; Yerrick, Parke, & Nugent, 1997).

In change implementation, the belief that teachers, in particular, are important agents of reform has been strongly emphasised (Nespor, 1987; Pajares, 1992; Prawat, 1992b; Raths, 2001; Richardson, 1996). Teachers are expected to play a key role in changing classrooms and schools. Given the predominant objectivist view that exists, social constructivist theory based reform not only places greater demands on teachers' roles but also requires a radical shift in teachers' thinking (Prawat, 1992a, 1992b). If teachers are to move towards the sorts of ambitious instruction envisioned by reformers, it is their knowledge and beliefs that become the targets of change. For teachers to shift their beliefs to accommodate a social constructivist epistemology would require them to develop new philosophies, epistemologies as well as new practices and to abandon well-established and seemingly successful practices (P. Taylor, 1990).

Paradoxically, however, teachers are also viewed as the major inhibitors to educational change (Adams & Chen, 1981; Griffin, 1986; Prawat, 1992b). Much of the literature on teacher change – particularly in the 90s – has strongly expressed the view that teachers are

recalcitrant and reluctant to change (Richardson, 1998). It suggests that teachers resist doing whatever is being proposed because they want to cling to their old ways and because change makes them feel uncomfortable (Duffy & Roehler, 1986; Fullan, 1991; Richardson, 1998). Prawat (1992b), for example, argues that teachers' beliefs pose a major obstacle to educational reform "because of their adherence to outmoded forms of instruction that emphasize factual and procedural knowledge at the expense of deeper levels of understanding" (p. 354). Teachers' beliefs, claims Prawat, are inconsistent with constructivist and social constructivist approaches to teaching and learning.

At the same time, much of the literature on beliefs considered beliefs to be important influences on perceptions by serving as critical filters for how individuals interact with life experiences. They are formed early in life, tend to self-perpetuate, persevering even against any contradictions that may be caused by reason, schooling, or experience. Nespor (1987) and Pajares (1992) suggest that beliefs are incontrovertible and difficult to alter. Given that the majority of teachers' school experiences are grounded in the objectivist epistemology and its classroom practices, this seems to suggest a cycle of the same objectivist self-perpetuating beliefs that are difficult to break.

Teachers' fundamental beliefs about teaching and learning, therefore, are considered determinants of change. Addressing them becomes an important step in any effort to bring about educational reform. The current investigation focuses on studying the development of pre-service and in-service teachers' educational beliefs. It endorses an alternative mindset and framework of thinking about beliefs, change and development using Perry's (1970) model of 'Intellectual and Ethical Development'. In doing so, the study aims at marrying two, seemingly distinct, areas of research: teachers' beliefs and the intellectual and ethical development of university students. It also provides a different perspective on Perry's analysis by extending and testing his conceptualisations with a different group (teachers) and in a new, quite related, domain (perceptions of teaching). The importance of this original approach is accentuated by the fact that the application of epistemological models to the beliefs of teachers has been very rarely addressed compared to how it has been in the research on students' beliefs and learning.

Contrary to the prevailing thinking about beliefs, Perry (1970) believed that beliefs do change. He found a linear progressive pattern of development in his scheme of 'Ethical and Intellectual Development' tracing the path of development of university students' epistemological beliefs through the four years of their study. In this model, students move from the categorical view of "simple 'either-or ness' of good and bad" (Perry, 1970, p. 33) to the latter positions that are more complex and sophisticated where students perceive different realities, cope with the uncertainty this involves, learn how to make commitments and experience the affirmation of identity among multiple responsibilities and realities. Perry perceived the sequential challenges of this path as essential steps in a person's maturation in a changing, pluralistic culture in which man's very knowledge and value are seen to be relative. In its essence, development – from Perry's perspective – involves a shift from the objectivist view of knowledge to the social constructivist one.

Not only does Perry's model run counter to the recently prevailing views that the capacity of maturing intellectual power reaches its highest by the time students enter college (White, 1999), but it also emphasises the viewpoint that structural changes in how one perceives the world is possible at any point of one's life. In his pioneering empirical work, Perry conceptualised the process of change and development in a nine-positions scheme describing the effect of university's 'liberal education' on developing complex qualitative changes in adults' minds. In the current study, Johnstone's (1998) modifications of his model is used as it created a simple shared language that can be used to understand the perspectives from which students and teachers think about their learning and teaching. Further refinements of Johnstone's model are also suggested to extend its scope and to reflect aspects of the social constructivist epistemology. Moreover, because his conceptualisations assume universal generalisability that transcends cultural differences, Perry's model provided a framework that allowed for the cross-cultural investigations conducted in this current study.

1.2 Aims and Objectives

Higher education has traditionally viewed its role as one of facilitating growth, in particular intellectual and ethical growth. As Baxter Magolda (1992) stated, "Understanding college students' intellectual development is at the heart of effective educational practice" (p.3). Perry (1970) believes that it is the university's mission to turn the undergraduates into 'metaphysicians' who are critical about their learning and also are able to transfer that thinking to other aspects of their life, i.e. to people, power, beliefs, religion, etc. University, then, should "... present to the student's attention in concentrated form all the questions that the sophomore in man has raised for himself through the ages and which he has then spent the rest of his history trying to resolve, rephrase, or learn to live with" (Perry, 1999, p. 37).

Drawing on that, this study intends to:

- Find out if and how student teachers' educational beliefs change over their four-year BEd degree. If change occurs, does it happen in a pattern similar to that anticipated by Perry (1970)?
- Ascertain how the educational beliefs of undergraduate student teachers compare with those of postgraduate student teachers. Do the different routes into teaching result in different belief frameworks?
- Compare the educational beliefs held by student teachers with practicing teachers.
- Investigate if the overall pattern of development is universally generalisable across cultures.
- Explore the factors teachers perceive to be responsible for any change in their belief profiles and provide a cross-cultural perspective on them.

- Explore what teachers from different cultural contexts perceive to be the most strategic leverage points for educational change.

- Gain a cross-cultural insight into teachers' perceptions of issues related to the possibility of achieving educational reform.

The cross-cultural contexts of the current investigation are the Egyptian and the Scottish educational institutions (i.e. universities and schools). An outline of the structure of Egyptian and the Scottish systems is presented in Appendices 1.1 and 1.2 respectively. The purpose behind conducting such an examination is not to compare rigorously one setting to the other, as the intervening variables are beyond any experimental control, but rather to aim at identifying the underpinning 'universal' human patterns of development as those conceptualised in Perry's model. In addition it is possible to gain an insight, from any similarities or differences that may exist between teachers' perceptions of their contexts, on the process of belief change, how it can take place and what factors are perceived as important for effective educational change to take place. The ultimate goal is to inform our understandings of how to achieve effective learning, teaching, and schooling.

1.3 Importance of the Study

The importance of the current study can be addressed from six aspects. The latter two are particular to the Egyptian context.

Firstly, although research on teachers' beliefs has been on the increase in the past two decades, it is still considered in its infancy (Bean & Zulich, 1992). There is a need for more research because inquiry into this topic, according to Munby (1982), is central to a more complete and useful understanding of thought processes in teaching. Armour-Thomas (1989) noted that the investigation of teachers' thought processes is an exciting new area in research on teaching, in that "the field promises to yield information that may revolutionalize the way we traditionally conceived the teaching-learning process" (p. 35). Pajares (1992), similarly, argues that the investigation of teachers' beliefs "should be a focus of educational research and can inform educational practice in ways that prevailing research agendas have not and cannot" (p. 307).

Secondly, the study of teachers' beliefs is particularly important, as "the big advances in understanding about students' learning have not been matched by equivalent advances in understanding about teaching. How to teach under real-world conditions in such a manner to foster this kind of [social constructivist] learning is not well understood as learning per se" (Anderson & Mitchener, 1994, p. 36).

Thirdly, in their review of 'educational change' research literature, Anderson & Helms (2001) have emphasised the need for more research that would "be approached from multiple perspectives, be conducted in the 'real world'..., not assuming change can be driven from the top down" (p. 3). The current study aimed at filling these gaps as it approaches the issue of educational change from the perspective of student teachers and

teachers giving them the voice to talk about it, what they need and how to make educational change happen. In other words, this study aims at identifying, from teachers' perspectives, where and how about to break the cycle in order to achieve a deeply rooted change.

Fourthly, because there has been a lack of empirical cross-cultural validation of the universality presumed by cognitive developmental theorists, particularly in non-western settings, this study embarks on providing an addition to the paucity of the existing literature by cross-culturally validating Perry's developmental scheme.

Fifthly, much of the recent educational and psychological research on Egyptian university students has been of an interventionist nature where many of the latest ready-made, empirically and theoretically sound educational 'American' programs have been imported and their effectiveness has been put to test. Despite the importance of these research studies, diagnostic and investigative research has become a void from the recent Egyptian research scene. There is a fear that the increasing interest of providing 'external' treatments would make researchers lose sight of the nature of the society they are dealing with, its characteristics, its unique make up and problems and how to plan for intervention accordingly. As Fullan (1993) describes it, "we have been fighting an ultimately fruitless uphill battle. The solution is not how to climb the hill of getting more innovations or reforms into the educational systems, we need a different formulation to get at the heart of the problem, a different hill so to speak. We need, in short, a new mindset about educational change" (Fullan, 1993, p. 3). It is hoped that this type of research would spark the interest of pursuing this mindset to approaching and researching our individualistic society and its peculiar problems.

Sixthly, the interest in developing human potentialities – with populations that exceeded the age of young children and adolescents under the age of 16 – in the educational and psychological research projects in Egypt has been quite recently initiated and carried out by Al Asar's* movement of 'Psychological Education', in the early 90s. However, the existence of a field of a study as 'university student development' does not echo the reality of university teaching, let alone theories of student development. Educators and researchers have ignored the matter of how students' ways of reasoning change over their four years of college experiences. In addition, the issues of teaching and learning as well as that of educational programming are addressed in a way that different cognitive-developmental stages of the students have not been taken into account. In summary, in fostering college students' development, the practitioners have been using their own implicit theories of what they think are best for their students. Therefore, the results of the current investigation could be used as guidelines by Egyptian educators in designing

* Safaa al Asar, an emeritus professor at Ain Shams University in Cairo. Early 90s, she established a movement – within the Egyptian academia – called 'Psychological Education' aiming to promote the cultivation of human potentials believed to be largely untapped in most people. She conducted and directed several research projects with the premise that this development can lead individuals to experience better quality of life filled with happiness, creativity and fulfilment.

educational programs and in thinking about their teaching. It is also hoped that, at the minimum, these research results would arouse the curiosity of the Egyptian educators as to what kind of cognitive reasoning their own students are using and what they can do to improve the quality of teaching and learning.

1.4 Thesis Structure

The thesis is structured as follows:

Chapter *One* provides the introduction (herein).

Chapter *Two* presents the argument that education has undergone a paradigmatic shift. It also examines the paradigm of thinking that used to be predominant in education in the industrial era. Theories underpinning the new paradigm of thinking are presented as well. The transition from one paradigm to another is highlighted and criticised.

Chapter *Three* presents a review of the literature on student teachers' and teachers' beliefs about teaching and learning. Issues related to beliefs' definition, importance, formation, the nature and mechanism of belief change and beliefs' relationship to practices are also discussed and criticised.

Chapter *Four* examines the different instructional approaches or teaching perspectives that exist in the literature and are congruent with the previously discussed thinking paradigms.

Chapter *Five* discusses and criticises Perry's conceptualisations upon which the study is based.

Chapter *Six* considers the methodological issues and concerns of the first phase of the study.

Moving to the fieldwork, Chapters *Seven*, *Eight* and *Nine* provides the results, data analysis and discussion of the findings of the first part of the investigation.

Chapter *Ten* presents the methodologies and methods of phase two of the investigation.

Chapter *Eleven* discusses the findings of follow up interviews that were conducted to further validate and investigate the results gained from the previous part of the investigation.

Chapter *Twelve* explores the generalisability and applicability of phase two findings in both the Egyptian and the Scottish contexts.

Lastly, Chapter *Thirteen* concludes the thesis with a summary, discussion and reflection on the major findings. It proposes relevant suggestions for educational practices and recommends issues for further research.

Chapter Two

Paradigms of Thinking

2.1 Introduction

Change seems to be a constant in education worldwide. Since the early 1980s, the term "paradigm shift" has been used as a means of thinking about change in education. The word 'paradigm' is associated with the American physicist Thomas Kuhn in his book '*The Structure of Scientific Revolutions*' (1962). In this book, Kuhn hypothesises about the process by which major changes come about in scientific fields. He suggests that scientific research proceeds through long, relatively stable periods of 'normal science' occasionally interrupted by brief, chaotic times in which new paradigms for research may emerge. He identifies normal science as "research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice" (Kuhn, 1970, p. 10). A scientific achievement represents a paradigm for Kuhn if it influenced practitioners in the discipline to hold a common body of beliefs and assumptions: if the practitioners are to agree on the problems that need to be solved, the rules that govern research, and on the standards by which performance is to be measured.

In this chapter, from a Kuhnian perspective, the argument that education has undergone a paradigmatic shift is presented. In order to understand it and to grasp its nature and impact and what needs to be done, a discussion of the following four topics seems warranted: First, what defines a 'paradigm', a 'paradigm shift' and the underlying make up that constitutes a paradigm? Second, what possible worldviews emerge, how each worldview differs in viewing learning and teaching and what assumptions exist in the literature about teachers' views of the world? Third, what paradigms and implicit theories of learning were dominant in society and education of the last century? Fourth, an exploration into the nature of this century: what paradigm crises exist and why? Before pursuing with the discussion of these topics, an analysis of the legitimacy of applying Kuhn's theory from the sciences to the social sciences and humanities is examined.

2.2 Kuhn's Theory from Science to Social Sciences and Humanities

Some researchers (Blom, 1984; Thagard, 1992; Whitehead, 2006) have raised some concerns about the legitimacy of applying Kuhn's theory from the so-called hard sciences to the social sciences and humanities. The argument that it is, indeed, possible to use Kuhn's ideas and terminologies from talking about the philosophy of science to talking about to the philosophy of education is presented. Central to this argument is the discussion of two main issues: what defines natural science and what role theory plays in the emergence and dissolution of research paradigms.

First in this regard is the issue of what defines natural science? Simon (1969) defines natural science as "a body of knowledge about some class of things – objects or

phenomena – in the world; about the characteristics and properties that they have; about how they behave and interact with each other" (p. 1). The historical events, on which Kuhn focuses, such as the discovery of oxygen and the Copernican model of the solar system, and the development of Newtonian physics are clearly examples of this type of science. In education, considering the central thrust and endeavours of recent psychological and educational 'achievements' have been in some respect to discover new principles about the human behaviour and the human brain, its functions, and how it best learns, it can be argued that such achievements could be described as natural science.

A second related concern has to do with the role of theory in the emergence and dissolution of research paradigms. Thagard (1992) argues that though there have been noteworthy conceptual shifts in the social sciences, such as the shift in psychology from behaviourism to more cognitive approaches, they are different from the revolutionary shifts that have occurred in the natural sciences. Thagard makes a critical distinction between theories and approaches. He defines a theory as a "coherent collection of hypotheses, [which] serve to explain a broad range of empirical generalizations and facts" and an approach as "a general collection of experimental methods and explanatory styles" (1992, p.225). He concludes that because the social sciences have failed to produce any broad, unifying theories comparable to Newton's theories of mechanics or Darwin's theory of natural selection, the conceptual shifts that have marked past research in these fields are "more the result of methodological considerations than evaluations of explanatory coherence" (p. 225). Thagard's proposition can be disputed because the shift that has occurred in education and psychology is in fact driven by shifts in underlying psychological theories of learning and instruction, informed and based on advances in experimental cognitive studies.

In response to those two issues, Koschmann (1996) – talking specifically about instructional technology as a field of study – argues that instructional technology as a field of study is different in many respects from the scientific disciplines described by Kuhn. This, nonetheless, "... does not mean that it could not be productively studied by the same means... there is no reason to believe that the cultural factors that organize and lend structure to the field would be any different from the analogous factors operating within the disciplines studied by Kuhn" (p. 3). As to Thagard's distinction between theories and approaches, Koschmann (1996) uses the same argument saying that, "Although the underlying theories of learning and instruction... do not meet Thagard's standard for a "theory", the fact that they have resulted in paradigmatic shifts in practice is the important issue here. Whether we choose to call the fundamental reconceptualizations underlying these shifts 'changes in theory' or 'changes in approach' is of little consequence to this discussion" (p. 3). For all of the above refutations, Kuhn's perspective is adopted as the basis for the current discussion.

2.3 Defining a Paradigm, a Paradigm Shift and a Paradigm's Make-Up

This section aims at presenting a brief definition of what is meant by a paradigm. It also discusses when a paradigm shift takes place. The underlying structure of what constitutes a paradigm is also presented.

2.3.1 What is a Paradigm?

A paradigm is defined as a shared theoretical framework and a working model that governs activity in the profession. It raises a compelling set of researchable questions and attracts interest in pursuing those questions (Koschmann, 1996). A paradigm supplies its practitioners with "topics, tools, methodologies, and premises" (Lehnert, 1984, p. 22). Coll & Taylor (2001) define it as "a set of basic beliefs (also referred to as metaphysics) that is concerned with ultimate or first principles and represents an individual's worldview, as such a paradigm defines for the holder a view of the nature of the world, the individual's place in it, and the relationships between the individual and the world and its parts" (p.216). It is a pervasive, omnipresent, and a taken-for-granted invisible web of relationships that permeates and is present in every taken action (Caine & Caine, 1997a). A paradigm, therefore, "encompasses the principles, values, and attitudes that structure our beliefs and guide our behaviors" (Draper, 2001, p. 153).

2.3.2 What is a Paradigm Shift?

A paradigm is not necessarily immutable. It is refined and extended through use. In Kuhn's words, it becomes "an object for further articulation and specification under new and stringent conditions" (Kuhn, 1970, p. 23). When several people working in a field begin to encounter anomalies or phenomena that cannot be explained by the established paradigm, the accumulation of contradictions and inconsistencies eventually leads scientists to question the capability of the predominant traditional paradigm to solve many of the serious problems faced. This gives way to new innovatively devised models that aim at providing explanations and answers. When a 'paradigm crisis' is initiated, a 'paradigm debate' follows and then the eventual replacement of one theory by a new one i.e. a 'paradigm shift'. Those who adhere to the new paradigm adopt an altered *Weltanschauung*, prescribing new ways of observing, interpreting, reflecting upon, and describing the world. Over time, competing paradigms may emerge. Such shifts are always revolutionary occurrences. As Kuhn observed, "the transition between competing paradigms cannot be made a step at a time, forced by logic and neutral experience. Like the gestalt switch, it must occur all at once (though not necessarily in an instant) or not at all" (Kuhn, 1970, p. 150). Examples of paradigms in science are the theories of quantum mechanics, evolution through natural selection, double helix DNA, etc.

This simplified sketch of Kuhn's theory seems to reflect accurately not only his perspective on the history of science, but also the paradigms, paradigms crises and paradigms shifts in the history of educational and psychological thinking. No wonder then that Kuhn's theory has become a common analogy and part of the vernacular about the

current state of the psychological and educational thought and philosophy. Understanding how his theory applies to the educational thinking entails first an exploration of what constitutes a paradigm. This is discussed next.

2.3.3 A Paradigm and its Make Up

Cohen & Manion (1994) have identified three components as the underlying make up of any paradigm: ontology, epistemology and methodology. The relationship among these components is summed up in the following figure (Figure 2.1). In this figure, a paradigm or a worldview is made up of ontological views (realist, contextualist and relativist), epistemological beliefs (objectivist, social constructivist and subjectivism) and methodology. They are further explained in the following sections. Exploring them is important to understand the nature of various philosophical worldviews. These worldviews form teachers' perceptual orientations that influence their instructional approaches and the experiences teachers direct and encourage for students within the classroom.

Figure 2.1:A Paradigm's Make Up: Ontology, Epistemology and Methodology

A paradigm's first component of *ontology* is concerned with the basic form, nature, and characteristics of reality. *Epistemology*, its second component, is concerned with the nature of knowledge and the relationship between the knower and the known. It is generally assumed that an individual's epistemological views is dependent on their ontological views (Coll & Taylor, 2001). A paradigm's third component is *methodology*. It addresses the issue of how to go about finding out whatever it is that is believed we know or can come to know (Guba & Lincoln, 1994; Schwandt, 1994). It is concerned with the *practice* of how best to come to know the world. It specifically refers to the science of teaching and is commonly used interchangeably with teaching and instruction (Gore, 1993). It is used in here to refer to the ways in which the curriculum is manifested in the classroom (Eisner, 1979). It, therefore, takes into account a variety of teaching and instructional practices, including the role of the teacher, teaching style, the ways in which the classroom is

managed, and all of the specific instructional and assessment strategies that are utilised. It is also dependant on an individual's ontological and epistemological stances. More elaborations and examples on the relationship among them will be provided later on in this chapter.

2.4 Emerging Worldviews and Paradigms

A number of writers have identified a bewildering number of paradigms of learning (Table 2.1).

Writers	Paradigms' Number	Identified Paradigms
Pepper (1942)	Four	Formism, Mechanism, Contextualism and Organicism.
Draper (2001), Zinn (1990; 1999) Scott (1998)	Five	Behaviourism, Liberalism, Progressivism, Humanism, and Radicalism.
Hiemstra (1988)	Seven	Idealism, Realism, Progressivism, Liberalism, Behaviourism, Humanism, and Radicalism.
Beder (1991)	Three	Liberal-Progressive, Counter Critique, and Personal Growth.
Coll & Taylor (2001)	Four	Positivism, Post-Positivism, Critical Theory and Constructivism.
Pelletier (1994)	Three	Maturationist or Nativist View, Behaviourist and Constructivist View (encompassing both cognitive and socio-cultural perspectives).
Prawat & Floden (1994)	Three	Mechanistic, Organismic and Contextualist.
Cunningham & Fitzgerald (1996)	Five	Positivism, Formalism, Realism, Structuralism, Postmodernism.

Table 2.1: Examples of Paradigms Identified in the Literature

It is worth noting that each paradigm is considered as a "belief system" (Coll & Taylor, 2001, p. 216), as an act of faith. Therefore, it is crucial to realise that no paradigm is or can be considered as an indisputable truth. Guba & Lincoln (1989) suggest that "advocates of any particular construction must rely on persuasiveness and utility rather than proof in arguing their position" (p. 108). Developing a historical or comprehensive comparative analysis of these paradigms is an ambitious project that goes beyond the purpose of this chapter. Therefore, a cursory sketch is presented of three different worldviews referred to as the realist, the contextual and the relativist. They are selected because these terms occur most frequently across the literature. Similar core epistemological and ontological perspectives are described in several recent reviews (Greeno, Collins, & Resnick, 1996; Prawat & Floden, 1994; Schraw & Olafson, 2002; Shuell, 1996). Moreover, they are quite similar to those presented by curriculum theorists and educational philosophers (Schraw & Olafson, 2002). They, for example, correspond to the mechanistic, contextualist and organismic worldviews described by (Prawat & Floden, 1994) and the realist, contextualist, and post-structuralist worldviews described by Fitzgerald and Cunningham

(2002) as well as the transmission, transaction, and transformation perceptual orientations of Caine and Caine (1997c).

Cohen and Manion (1994) identified two basic views of looking at reality in response to the question "Is reality external to individuals – imposing itself on their consciousness from without – or is it the product of individual consciousness?" (p. 6). That there is a single independent reality existing outside the reference frame of the observer is the position of the *realist* ontology. Reality from the realist perspective is immutable, and conforms to natural laws – many of which possess the nature of cause and effect. According to Cohen and Manion (1994), adherents to this ontology is likely to be *objectivist* in epistemology, "a view that knowledge is hard, objective and tangible will demand of researchers an observer role" (p. 6). The motto of this view is basically 'seeing is believing'. At the other end of the spectrum is the *relativist* ontology. In its radical form, it asserts that there exist multiple realities. From such a perspective, there is no casual relationship and mental construction precedes observation (Boyd, 1994). *Subjectivism* is the emerging epistemology. It believes that the findings of any inquiry are created by the investigator (Coll & Taylor, 2001). As Schwandt (1994) puts it "What we take to be objective knowledge and truth is the result of perspective. Knowledge and truth are created, not discovered by mind" (p. 125). The motto of this is 'believing influences what is seen'.

Contextualist ontology is positioned in the middle of this spectrum (Schraw & Olafson, 2002). *Social constructivism* is the likely adopted epistemology. Contextualists argue against the strict absolute universalist view adopted by realists and the radical particularist relativist view. In contextualist ontology, reality is an amalgam of both. It stresses the contextual and social nature of reality as being social construction that cannot be independent of the knowers.

2.4.1 Three Worldviews: Perceptual Orientations on Learning and Teaching

The three paradigms: realist, relativist and contextualist, in their extreme forms, develop three different portraits of teaching and learning. When key questions are posed in each of the different paradigms, very different answers emerge. For example: What is learning? What is to be learned? From whom? How can it be taught? What is the teacher's role? What is the learner's role? What is the role of peers? What is the purpose of learning? How learning can be assessed? What does a learning environment look like? The differences in teaching and learning between each of those paradigms are, therefore, discussed.

Reality, in the realist paradigm, exists as *Truth* outside the knower and knowledge is absolute, universal and relatively unchanging. Realist teachers believe in the primacy of their own knowledge; thus, the curriculum is their main vehicle for helping students to acquire that knowledge. Curriculum is viewed as a 'product' comprising a fixed, fact-based, body of knowledge considered by experts as essential for learners to know

(Windschitl, 1990). Experts' knowledge is implicitly perceived as closer to reality. The role of the teacher-as-expert is to serve as the conduit for the transfer of this body of knowledge through lessons prepared in advance by textbook companies, computer programs or state and district supervisors (Davis, McCarty, & Sidani-Tabbaa, 1993; Kincheloe, Slattery, & Steinberg, 2000). Realist teachers believe in the primacy of exogenous* construction of knowledge (Harris & Alexander, 1998; Prawat, 1996; Pressley, Harris, & Marks, 1992). They tend to reduce and structure the curriculum by dividing it into parts that build to form a big concept. This type of teaching is referred to as mechanistic (Caine & Caine, 1997c; Prawat, 1996) because it is direct, invariant and imposes a hierarchic relationship between the teacher and the student. Realist class teaching, therefore, involves a carefully orchestrated exchange between the teacher and the students in a highly structured series of learning opportunities over which the teacher has much control (De Alba, Gonzalez-Guadiano, Lankshear, & Peter, 2000). As such, it constitutes teacher-centred instruction with an abundance of drill and practice. Students in such a context are viewed as passive recipients of knowledge. They are expected to be self-regulated, but only to the extent that they master the same knowledge as the 'experts'.

Learning becomes a process of replicating existing knowledge rather than constructing new knowledge: learners construct schemata, but these schemata are more or less identical to those of other learners and the teacher (Derry, 1996). In such a process, the role of peers is relatively unimportant. Unlike the expert, they are perceived not to possess a well-structured knowledge base and therefore are unreliable and unimportant to their fellow students. From this perspective, assessment seeks singularly and simply to determine whether students have mastered the core knowledge and skills of the curriculum. Students are expected to recognise the answers rather than generate them. Assessment has norm-referenced standards (state and national norms) as all students are expected to master the same essential curriculum. It frequently and largely consists of paper and pencil objective tests that can be easily scored and compared (Schraw & Olafson, 2002). In its essence, such a view is consistent with what Perry (1970) calls 'Dualism'.

Radical relativists form the converse of the realist paradigm. They oppose the notion of universal knowledge and truth (Cunningham & Fitzgerald, 1996). In relativism, each individual constructs his/her own reality. Being subjective, no one can dictate what knowledge and reality mean (Cunningham & Fitzgerald, 1996; Kuhn, 1991). The only real knowledge and truth is in the eye of the beholder (Schraw & Olafson, 2002). Knowledge is subjective, particular, idiosyncratic to the knower, and is highly changeable. An individual's knowledge cannot be assumed inferior or superior to any other individual's knowledge (Von Glaserfeld, 1984, 1992). Relativist teachers dismiss the idea of 'one size fits all' curriculum. Their curriculum choices are structured around students' development and social reform (Pratt, 1998). Students are invited to construct their own knowledge base; about themselves, the world, to question existing power bases, justice and ecological

* Knowledge construction is originated from outside; derived externally.

sustainability (Kincheloe et al., 2000; Pratt, 1998). The purpose of teaching is to help students to investigate the curriculum and is, therefore, centred around independent student projects. The teachers' role is as a mediator and a facilitator of students' learning, rather than as a disseminator of privileged knowledge. Given that constructing knowledge as endogenous* is their primacy; relativist teachers tend to support autonomous learning by discovery or scaffolded experiences.

Learning is viewed as a self-learning and student-centred process and it is the teacher's role to nurture independent thinkers. Most learning experiences are constructed on an individual basis and to involve strategies that promote reflection (Campbell & Bickard, 1986), discovery (Siegler, 1996), and self-explanation (Chi, De Leeuw, Chiu, & La Vancher, 1994). Each student, therefore, is viewed as a unique constructive agent (Yackel & Cobb, 1996) who is self-regulated by setting his/her own goals, constructing appropriate solutions and providing self-generated feedback (Butler & Winne, 1995). The role of peers in the relativist context is similar to the realist one that it is less important than the role of the individual him or herself. Though they concede that peers may facilitate reflection in some students, they do not improve understanding (Schraw & Olafson, 2002). Assessment in this context is tailored to match students' different needs, styles and learning goals. Assessment practices include multiple representations of learning that demonstrate students' diverse activities and accomplishment through the use of written, numerical, oral, visual, technological or dramatic media (Hargreaves, Earl, Moore, & Manning, 2001).

Reality from the contextualist perspective is neither universal nor particular: it is a mixture of both. Knowledge is perceived as negotiated consensually to meet situational demands (Lave & Wegner, 1991; Ryan & Patrick, 2001; Schraw & Olafson, 2002). As such it is changeable overtime as standards and needs change. From this perspective, curriculum is viewed as a student-centred process that is less concerned with absolute truths and more with an agreed, contextual explanation that makes sense of and explains observed phenomena (Davis et al., 1993). Problem-based curriculum activities, inquiry activities and exposure to multiple sources of information are examples of such curricula (Schraw & Olafson, 2002). Although there is essential knowledge for students to learn, they are encouraged to construct this in meaningful ways that enables them to apply it efficiently in real-life situations. Students are expected to change knowledge to meet their own demands. Contextualist teachers endorse a dialectical primacy in constructing knowledge via student collaboration, scaffolding and cognitive apprenticeships (Cooper, 1999; Hogan & Tudge, 1999). Teachers' main goal is to create, in the classroom, a community of learners that would enable students to interact with each other and to change the curriculum to meet their individual and collective needs. Most contextualists place emphasis on modelling knowledge construction and use rather than the transmission of knowledge (Patrick, 1997; Rogoff, 1995).

* Knowledge construction proceeds from within; derived internally.

In the process of learning, individuals collaboratively construct knowledge. Reality, thus, cannot be known independent of the knower (Prawat, 1992b). Students are perceived as actively engaged in knowledge construction to fit contextual demands in collaboration with teachers and other students. It is expected that different students will construct different schemata based on similar inputs from experts. It is assumed also that students are to be constrained in their construction due to their interaction with others. As Vygotsky (1978) argues learners are constrained by scaffolding guidance from 'the more knowledgeable other' within the learner's zone of proximal development. Learners gradually construct an increasingly sophisticated knowledge within the mediation of the more knowledgeable learners – who guide and model at the upper end of the learner's current skill and knowledge level. For contextualist teachers, peers play a significant role in the learning process. Because of the smaller knowledge gap between peers, they are likely to co-construct knowledge more effectively than between an expert teacher and novice students. Consequently, there have been a large number of studies that have investigated the effect of peer support, for example reciprocal teaching (Palincsar & Brown, 1984) and cooperative learning (Cohen, 1994). In this respect, contextualists take a radically different viewpoint from the two other paradigms. Contextualist teachers are also more likely to use alternative assessment formats such as individual and group portfolios and performance-based assessment. They are also more apt to use local assessment instruments (e.g. district or school-based) and to focus on criterion-referenced outcomes (Tzuriel, 2000). In essence, contextualism represents a non-dualistic view. In many respect, it seems consistent with what Perry (1970) calls 'Relativism'. The differences among these paradigms are presented in the following table (Table 2.2).

	Realist (***Positivist or Objectivist***)	**Contextualist** (***Social Constructivist***)	**Relativist** (***Subjectivist or Constructivist***)
Beliefs about knowledge	Knowledge is objective and universal; independent of knower; relatively unchanging	Knowledge is situational; adopted by knower to fit contextual demands; change consensually	Knowledge is subjective and particular; unique to knower; highly changeable
Beliefs about reality and standards for judging truth	Objective reality; truth correspond to external reality and universal standards	No objective reality; consensual truth using negotiated standards	No objective reality; no consensual truth, but personal truth is subjective in nature using idiosyncratic standards
Beliefs about curriculum	Acquisition of previously identified knowledge base and learning skills	Acquisition of relevant knowledge and skills; encourages students to adopt and change knowledge to meet present demands	Emphasizes multiple perspectives and analysis of knowledge adapted to meet individual needs and interests
Beliefs about methodology	Transmission; teacher-centered instruction	Transactional; group-centered instruction	Autonomous; individual-centered instruction
Beliefs about assessment	External, standards; norm-referenced; teacher feedback	Group-standards; criterion-referenced; self and peer feedback	Individual standards; criterion-referenced; self feedback
Beliefs about the role of the teacher	Expert; actively disseminates knowledge	Collaborator; actively guides learning by modeling; scaffolding and co-participation	Facilitator; actively provides feedback to student
Beliefs about the role of the learner	Passive recipient; self-regulation learned via teacher support	Active collaborator with peers and teachers; self-regulation acquired via peer and teacher support	Active constructor; self regulation acquired autonomously
Beliefs about the	Peers play small role	Peers play very important	Peers play small role

role of peers		role via modeling and collaborative assistance in zone of proximal development	
Beliefs about the constructivist process of learning	Exogenous constructivism; Primacy of experts; emphasis on *reconstruction*	Dialectical constructivism; reciprocity between self and experts; *co-construction*	Endogenous constructivism; primacy of self; *autonomous construction*

Table 2.2: A Comparison of Beliefs across Three Worldviews

Schraw & Olafson (2002)

2.4.2 General Assumptions about Teachers' Epistemological Worldviews

Schraw and Olafson (2002) have proposed five general assumptions about the realist, contextualist, and relativist worldviews as they pertain to teachers. These assumptions are worthy of mention here.

The first assumption is that teachers are consistent in their epistemological beliefs and thus, can be characterised by one of the three worldviews at any particular time. Similarly, Prawat & Floden (1994) believe that it is rare for hybrid positions to occur among the three world views. Basically this is because the views on many aspects across the three worldviews are incompatible (Table 2.2). In case teachers endorse potentially incompatible beliefs, they are expected to experience this with great cognitive disequilibrium and epistemological doubt.

The second assumption is that teachers' epistemological beliefs are consistent across different academic domains. Teachers' worldviews are domain-general rather than domain specific. Many researchers (Hofer, 2001; Hofer & Pintrich, 1997; Kuhn, 1991; Kuhn & Weinstock, 2002) agree that personal epistemologies are slow changing and consistent across domains and situations. Schommer (2002) has addressed this issue stating that "[m]ature individuals have a sense of self that is core. And that part of this sense of self is personal epistemology, an aspect of their epistemological beliefs that is domain general. This general core of epistemology beliefs may serve as the foundation from where their domain specific epistemological beliefs spring forth" (p. 112). There is, however, a need for empirical research to sustain this assumption.

The third assumption is that epistemological worldviews may be either tacit or explicit. Some researchers suggest that teachers frequently hold tacit beliefs about teaching and rarely endorse explicit theories of teaching practices (Calderhead, 1996; Kagan, 1992; Patrick & Pintrich, 2001). As these worldview beliefs become more explicit, individuals should be better able to reflect on and change them. Teachers with an explicit versus a tacit epistemological worldview may also differ in terms of how their beliefs affect teaching practices (Schraw & Olafson, 2002).

The fourth assumption is that different epistemological worldviews lead to different teaching practices (Cunningham & Fitzgerald, 1996; Hofer & Pintrich, 1997; Perry, 1999). This is echoed in what Cunningham and Fitzgerald (1996) have stated that "different

epistemological outlooks result in different forms of instruction and assessment." (p. 225). This would lead to the assumption that teachers who endorse a realist worldview would adopt a teacher-centred approach whereas contextualist and relativist teachers would prefer a student-centred approach. However, it is important to note that there have been reports of inconsistencies between teachers stated beliefs and teaching practices. This has been more fully discussed in chapter three.

The fifth assumption is that epistemological worldviews develop slowly and late in life. Research indicates that epistemological beliefs (Schommer, 1993), epistemic cognition (Kitchener, 1983; Kuhn & Weinstock, 2002) and epistemological worldviews (Baxter Magolda, 2002; Bendixen, 2002; Perry, 1970) change over time. These changes often occur slowly and with a great deal of cognitive disequilibrium. This assumption will be more fully discussed in chapter five.

Kuhn & Weinstock (2002) have argued that this change progresses from the realist, to a relativist, to a contextualist worldview. Entwistle has also proposed a developmental perspective of teachers' conceptions of teaching (Entwistle, Skinner, & Entwistle, 2000; Entwistle & Walker, 1999, 2002; Walker & Entwistle, 1999). In such a model "an initially limited conception moves towards a more sophisticated appreciation of the complexities of learning and teaching...through reflection and integration" (Entwistle & Walker, 2002, p. 15). This concept of a 'nested' hierarchy of teaching conceptions emerged from parallels drawn from two other separately identified hierarchies: Perry's (1970) epistemological thinking and Säljö's (1979) conceptions of learning (Figure 2.2).

In these two models, dualism is associated with a reproductive conception of learning and relativism with the conception of learning for personal development [as illustrated by the published extracts from Perry's interviews and as been empirically evidenced in (Zhang, 2004b)]. Entwistle goes on to associate dualism and reproductive conceptions of learning with the conception of teaching as organising and conveying testable knowledge. Similarly, he hypothesises that relativism and the conception of learning as a process for personal development is associated with the conception of teaching as a process of facilitating understanding and fostering conceptual change.

The parallel between Entwistle's model and these two models is empirically based on phenomenographic research conducted by Entwistle & Walker (2002). Through a case study of the retrospective reflective interpretation of Walker's personal experiences of teaching, they identified developmental hierarchies of teaching conceptions. These hierarchies are: *Organizing and conveying testable knowledge*, *Prompting understanding*, *Questioning the nature of physical knowledge*, *A multiple inclusive approach to teaching and Fostering learning* and *The search for personal meaning*. It's worth noting that "These are, of course, just descriptive parallels, and no more than that" (Entwistle & Walker, 2002, p. 31).

Despite initial promise, this work requires further study and more empirical evidence. Schraw and Olafson (2002) are, for example, uncertain about this developmental sequence being typical of teachers or that it implies a natural hierarchy in the sophistication of worldviews and White (2000) found that while teachers changed their views, it did not occur in a stage-like manner.

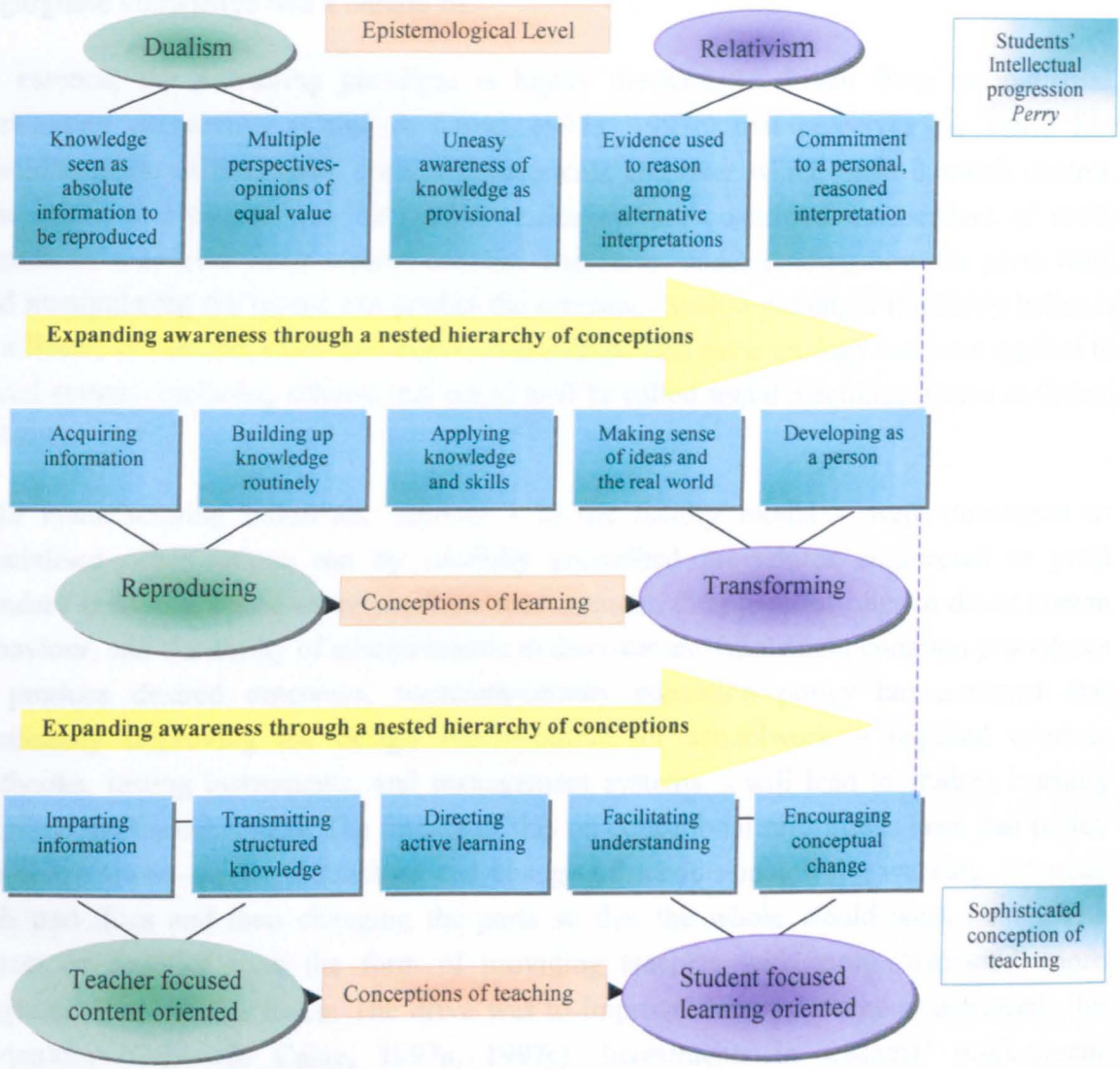


Figure 2.2: The Evolving Sophistication in an Understanding of Teaching

2.5 Society and Education of the Industrial Era

The teaching and learning manifestations of the realist ontology with its objectivist epistemology has universally been the long-dominant approach. It tends to be referred to as the *traditional* paradigm in research and in many policy documents worldwide (Carroll, 2005; Hardy & Taylor, 1997; Svinicki, 1991).

Educational systems based on a factory metaphor have been a perfect match for the nature and needs of the Western and Middle Eastern society in the latter part of the 19th century. The Industrial Era demanded that large numbers of people be educated to satisfy the needs

of industry. Mass education to teach identified knowledge and skills was a requirement. A factory assembly-line model for schools was convenient in that context. The administration of education – like the management model that permeated industry – is a model of hierarchies and bureaucracies (Caine & Caine, 1997a, 1997c). In addition, the "banking" concept (Freire, 1972) of education where 'teachers' deliver 'knowledge deposits' to fill the 'empty minds' of the passively receiving students whose job is to memorise and regurgitate knowledge was a natural fit.

In essence, the prevailing paradigm is highly mechanistic driven from an industrial, Newtonian perspective (Caine & Caine, 1997a, 1997c) that perceives the world like machine made of assembled parts and fragments and over which there is much control. The inputs and outputs can be reliably measured and quantified independent of many aspects of a broader more elusive context. Therefore, understanding how the parts work and manipulating the inputs can predict the outcome. Such a paradigm implicitly believes in a linear, systematic, cause and effect relationship. This same analogy has been applied to social systems including schools that could well be called social machines (Caine & Caine, 1997c).

Like manufacturing industries, schools – in the factory model – were developed as specialised organisations run by carefully prescribed procedures engineered to yield standard products. Based on rationalistic management, the power of rules to direct human behaviour, and the ability of administrators to discover and implement common procedures to produce desired outcomes, twentieth-century education policy has assumed that continually improving the design specifications for schoolwork – required courses, textbooks, testing instruments, and management systems – will lead to student learning (Darling-Hammond, 1997). The impact of this on educational reform has been that policy has concentrated on the restructure and change of schools mainly by working out what each part does and then changing the parts so that the whole would work better. The impact on practice took the form of providing teachers with more "adds-on," more programs, more things to do. The drive was to improve the way teachers 'delivered' the curriculum (Caine & Caine, 1997a, 1997c). Investments in teachers' professional development were small and of little importance as,

> Knowledgeable teachers were not part of the equation because the bureaucratic model assumed that important decisions would be made by others in the hierarchy and handed down in the form of rules and curriculum packages. (Darling-Hammond, 1997, not paged)

The Industrial Era's views of society and education had their reflections on how systems work and on identifying what learning is and how teaching should be like. Such views were reinforced by, then, the 'natural science' of the psychological theories: a brief description of which is presented next.

2.5.1 Psychological Theories Underpinning the Industrial Era Worldview

The development of learning theories has been and is still closely associated with psychology. The zeitgeist of psychological research of this era sustained mechanistic perspectives. Behaviourism, as a school of thought, has been the 'natural science' that has had an influential impact on learning and teaching.

Behavioural theorists like Pavlov (1849-1936), Thorndike (1847-1949), and Skinner (1904-1990) were concerned with observable, measurable, and objective behaviour as an indication of learning and what these observations imply for teaching. In their attempt to explain learning, behaviourists believed learning occurred when a predictable connection or relationship is established and strengthened among a cue in the environment (stimulus), a behaviour (response) and a consequence (reinforcement). Responses can be modified or rather conditioned by repeating the stimuli and by reinforcing them so that learning can be achieved. Learning is equated with the bonds and connections that exist between the stimuli and the response (Figure 2.3). With enough practice, the links become automatic.

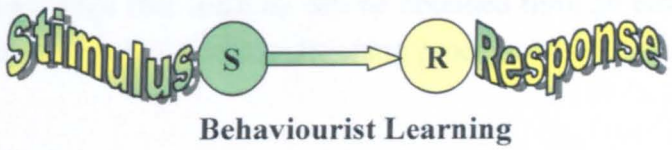


Figure 2.3: Behaviourist Learning Theory

From a behaviourist perspective, learning is considered largely as a passive process in which the learner merely responds and adapts to the demands of the external environment. In this process, behaviourists marginalised the mind of the learner as irrelevant to understanding behaviour; the focus was on setting the right conditions for learning: the content, the teaching process and the learning environment. In essence, behaviourism assumes that careful and systematic teaching will guarantee correct learning (Nussbaum, 1989). The teachers' role is to manipulate learning situations so that they elicit the desired responses from students which the teachers, then, reinforce.

Behaviourism, in brief, is predicated on a product-based curriculum (Child, 2004) and teacher-centred, transmissive instruction. It emphasises not only the importance of external reinforcement but also the use of highly structured teaching interventions such as 'programd learning' through which students go step by step to achieve externally imposed goals. Such behaviourist standpoints are important because they, arguably, still inform present-day teaching practices (Carroll, 2005). Consequently, behaviourism has become synonymous with the realist ontology, and objectivist epistemology that has guided psychological thinking about teaching and learning.

This approach advocated by behaviourists has provided a too simplistic and externalist view of learning. It has failed to answer questions about why and how changes take place in learners' experiences, understandings and conceptualisations of the world. It:

- reduced the learning process to a simple matter of conditioning;
- viewed learning as a receptive process demanding a transmissive pedagogy;
- reduced and closed down questioning to a right or wrong format with knowledge being crystallised and finite;
- failed to acknowledge that concepts can and do develop rather than remain the same;
- led to a rigid differentiation of learners on the basis of their capacity to achieve;
- led to a content-laden curriculum driven by achieving objectives;
- considered learning as driven by external rewards not as an intrinsically rewarding process in itself;
- failed to acknowledge that learning can be obtained through error and taking risks by confining it to an 'error free' conditioning process.

(Moore, 2000)

These problems gave rise to the emergence of alternative theories of learning. These alternative theories suggest that learning is a process internal to the learner and dependent on what he or she does to understand and derive meaning from and of the world. These theories are discussed more fully later in this chapter but first the discussion is of the social context of the information age and its influence on learning.

Despite the distinct differences identified and discussed between constructivist and social constructivist epistemologies especially in their extreme forms (section 2.4.1), the theories of learning based on both epistemologies have in common the assumption that knowledge is not passively received, but is actively constructed by the learner either individually or socially. Based on this assumption, both epistemologies mark a distinct departure from the objectivist and positivist epistemology where the focus is the learner's observable and measurable behaviours. The practical implication of this is that both share the desire to break away from the traditional instructor-dominated classroom teaching to encourage greater student participation and responsibility (this discussion will be detailed further in chapter four). Therefore, in the following discussion, in many instances, the term 'constructivism' will be used to subsume both individual and social constructivism.

2.6 Society and Education of the Information Age: A Co-evolution

In recent times, the metaphor used to describe social systems has changed. Recent dramatic advances in modern physics (atomic structure, the nature of electromagnetic radiation, gravity, and quantum mechanics and relativity) have challenged the conventional positivist thesis. The belief in the existence of absolute truth has given way to the development of the constructivist paradigm (Jones, 1994; Redhead, 1994). Advances in research in the neurosciences and cognitive psychology have further accentuated this profound shift. The simple assembly-line metaphor has given way to a living system metaphor that adequately reflects the nature of these changes and their impact. "Living systems are not linear. They have patterns of change that appear unpredictable because they are interconnected with their immediate environment. They are in relationship to each other, and they thrive on information. They act lawfully, but the laws they abide by appear messy" (Caine & Caine, 1997c, p. 4).

In such a metaphor, schools are viewed as complex, open and dynamic systems moving towards a state of disequilibrium where change is constant and outcomes are often unpredictable. Caine & Caine (1997a) describe such a state as moving towards "the edge of chaos" (p. 13) as change is constant, rapid and beyond control. The practical implication for educational reform policies is that traditional procedures for solving problems do not work. "Small actions can have large and unintended consequences, while large actions and interventions may have no impact whatsoever" (Caine & Caine, 1997a, p. 13). As the rules of control have changed, fundamental changes must take place for significant improvements to be possible. In other words, holding on to old beliefs and explanations ensures that many of the changes being introduced in education will have little beneficial effect.

This need for fundamental change has given rise to a need for a paradigm shift. At its core is the need to "internalize a fundamentally new ways of conceiving of and responding to the situation in which we find ourselves" (Caine & Caine, 1997a, p. 13). In such a paradigm, many of the basic ideas and beliefs that have governed education and the larger social system are being questioned. The most important question relates to the purpose of education: what are the human capacities that education has to nurture for the future? Caine and Caine's (1997c, p. 21-22) vision of these *intelligent*, complex, and integrated attributes are:

- an inner appreciation of the interconnected nature of this world;
- a strong identity and sense of being;
- a sufficiently large vision and imagination to see how specifics relate to each other;
- the capacity to flow and deal with paradox and uncertainty;
- a capacity to build a community and live in relationship with others.

Provided that the purpose of education is to provide opportunities to prepare self-actualised humans and to turn such a vision into a reality, there would be more to education than what the objectivist, behaviourist approach has to offer. As Johnston (1987) puts it,

> The objectivist paradigm is reaching the limits of its usefulness. As a result of an impressive and mushrooming body of research on the growth of scientific knowledge, this Objectivist view has been turned on its head, at least in its strong version. We have learned that what counts as knowledge is always a contextually dependent matter – there are no 'theory-neutral data' in the required Objectivist sense, and criteria of rationality are interminably evaluative and dependent on our purpose and interest (p. xiii).

Contextualist ontology with its social constructivist epistemology – in contrast to realist and objectivist orientations – offers a viable view of knowledge, reality, science and education for the future. In its essence, it captures the wholeness, interconnected and dynamic nature of reality. The effect of such change is to open endless possibilities. This is summarised by Belenky et al. (1986) as follows,

> To see that all knowledge is a construction and that truth is a matter of context in which it is embedded is to greatly expand the possibilities of how to think about anything, even those things we consider to be the most elementary and obvious. Theories become not truth but models for approximating experience. (p. 138)

However, the gap between present and future societal needs combined with the gap between *what* and *how* education moves toward fulfilling these needs has created a paradigm crisis.

2.6.1 Current Paradigm Crisis

This crisis is evident in many prevalent problems education faces today. For example, what the authoritarian model of the objectivist paradigm defines as *content* in basic education is being questioned in an information age where the knowledge base is growing at an extraordinary rate. Who should decide what is to be taught and who determines who the experts are? A mandated curriculum imposed by 'experts' assumes a 'one-size-fits-all' philosophy that does not take into account diversity of contexts and cultures.

Moreover, teachers within such a context are perceived by pupils and parents as the source of knowledge who have the *right* answers. Teachers feel pressured to be accountable for their students' performance and tend, therefore, to retain control giving their pupils little choice and little autonomy in their learning (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982). The forces dominant in the objectivist paradigm place teachers and pupils in exactly the same boat.

> When students are told what to study, without having any input and teachers are told what the curriculum is, both are experiencing compliance and helplessness. When students are told what to learn by what deadline, they share

> with teachers the experience that comes with being told what they have to teach, what they have to cover by this time, and when the grades are due. Students may be afraid of getting a bad grade, but teachers share similar fears. All we need to do is challenge a teacher on the grade given a student – woe to the teacher who cannot justify grades based on an accurate accounting of meaningless points. (Caine & Caine, 1997c, p. 99)

Teachers also tend to take all the blame when the objectivist school system fails (Davis et al., 1993).

From a behaviourist perspective, educators believe in maintaining external control and reinforcing behaviours that authority regard as 'good'. In such a paradigm, controlling behaviour is essential for learning to take place. Pupils who choose to obey the rules are often disempowered. Those who choose not to obey the rules, either rebel through more disruptive behaviour or opt out of the educational system altogether (Davis et al., 1993).

Many of the current assessment and evaluation methodologies are based on the objectivist paradigm. The use of objectivist tests seem insufficient in revealing what students' know, as they limit students' thinking. They limit student answers to their ability to match those of the test makers. Such a linear approach of 'test-teach-test' fails to capture the complexity of the learning process.

Davis et al. (1993, p. 627) point out four signs of the current paradigm crisis. First are the explicit expressions of discontent with educational theories and practices obvious in the myriad of articles and task force recommendations. Second is the current debate over legitimate methods of educational research and issues of validity and generalisability. Third is the emergence of new paradigms at professional conferences and the abundance of literature which addresses these subjects. The fourth and final sign is the proliferation of theoretical alternatives such as situated cognition, evident in many suggested solutions to the educational crisis.

2.6.2 Psychological Theories Underpinning the Information Era Worldview

Unlike behaviourists, constructivists would argue that observable, measurable behaviour (the focus of behaviourist theories) is merely the tip of the iceberg and that understanding the internal processes of the learner is crucially important. Constructivists 'went inside the head of the learner' and made mental processes their primary interest of study. The fundamental basis of constructivism is summed up be Wheatley (1991) as,

> The theory of constructivism rests on two main principles. The first principle is readily agreed to by most persons but the second causes much controversy. Principle one states that knowledge is not passively received, but is actively built up by the cognising subject. Ideas and thoughts cannot be communicated in the sense that meaning is packaged into words and 'sent' to another who unpacks the meaning from the sentences. That is, much as we would like to, we cannot put ideas in students' heads, they will and must construct their own meanings. Our attempts at communication do not result in conveying meaning

> but rather our expressions evoke meaning in another, different meaning for each person. Principle two states that function of cognition is adaptive and serves the organization of the experiential world, not the discovery of ontological reality…thus we don't find truth but construct viable explanations of our experiences. (p. 10)

Across all variants of constructivism there is consensus about the fundamental basis of the paradigm; that is, knowledge resides in individuals and is constructed by them. There is, however, a plethora of different interpretations of its relativist ontology that has been identified by Matthews (1994) as reaching twenty-one varieties. The continuum of constructivist versions varies from Hard Constructivism (or radical constructivism) through to Soft Constructivism (or pragmatic constructivism) (Matthews, 1994) or what Palincsar (1998) calls Trivial constructivism.

With all these variants, the basic premises of constructivism go back to the theories of Piaget (1896-1980). Piaget is considered as an influential proponent of the constructivist thinking. His theories on the development of cognitive functions in children formed the foundation of modern constructivism, in particular cognitive constructivism (Figure 2.4). Cognition (thinking and rational thought) for Piaget is an active and interactive process, with learners affecting and being affected by their interaction with the environment. The framework of his theories reflects three important dimensions that influence such interactions:

- The *genetic*: reflecting the notion that higher cognitive processes evolve from biological mechanisms rooted in the development of the central nerve system;
- The *maturational*: indicating that the process of concept formation follows an invariant pattern through several clearly defined stages linked to specific age ranges;
- The *hierarchical*: proposing that the stages must be experienced and passed through in order for further development to take place (Child, 2004).

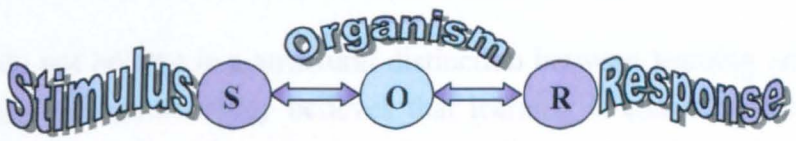
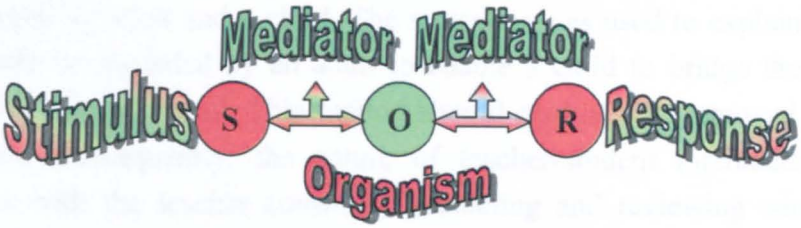


Figure 2.4: Cognitive Constructivism Learning Theory

For Piaget the development of human intellect proceeds through an invariant sequence of stages in which cognitive structures or 'schemata' become progressively more complex. In interacting with the environment, humans seek through adaptation (assimilation and accommodation) to achieve a state of equilibration or cognitive stability. It is this process

of maintaining equilibrium through constructing and reconstructing knowledge to make sense of the experiences that creates cognitive growth (more details are available in chapter five).

Vygotsky (1896-1934), like Piaget, stressed the role of the subject (or organism) in learning. Both believed in the active role of the learner in constructing meaning. Both believed that there are qualitative changes in thought not accounted for by the accumulation of facts and skills. Their views about estimating the role of the social context are, nevertheless, diverse. Vygotsky asserts the socio-cultural context of development (Figure 2.5). For him, the child's on-going interaction with the social world leads to the development of more complex understanding of reality; along with the development of their language skills which become the primary tool of *intellectual understanding.*



Social Constructivist Learning

Figure 2.5: Social Constructivism Learning Theory

He saw intellectual abilities as being influenced by and specific to the culture in which the child was reared (Vasta, Haith, & Miller, 1995). Culture makes two sorts of contributions to the child's intellectual development. First, children acquire much of their thinking (knowledge) from it. Second, children acquire the processes or means of thinking (tools of intellectual adaptation) from the surrounding culture. Therefore, according to Vygotsky, culture provides children with both *what* to think and *how* to think. He states:

> Every function in the child's cultural development appears twice: first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of ideas. All the higher functions originate as actual relationships between individuals. (Vygotsky, 1978, p. 57)

Behaviourists do not believe in a structural distinction between learning and development. Piaget in his genetic epistemology believes that learning is constrained by development giving much weight to the idea of maturation and cognitive stages in mental growth. Vygotsky, however, did not accept that learning must wait for development to take place and believed that learning, in fact, can lead development. He asserted that children are capable of operating at different levels if supported and guided by adults or more able peers within their *zone of proximal development* (ZPD). ZPD refers to the gap or "distance" between what a given child can achieve alone "as determined by independent problem solving" (level of actual development), and what they can achieve through

"problem solving under adult guidance or in collaboration with more capable peers" (level of potential development) (Vygotsky, 1978, p. 85).

Vygotsky viewed cognitive development as a result of a dialectical process, where the child learns through shared problem solving experiences with someone else, such as a parent, teacher, siblings or peer. Although these interactions can take many forms, Vygotsky stresses language and dialogue as the primary means through which adults engage with children. Through such dialectic interactions the child becomes able to incorporate or internalise the ideas he/she is engaged with. In such a process '*scientific thought*' becomes spontaneous and integrated into present thought processes (Griffith & Benson, 1994).

In 1976 Wood, Bruner and Ross developed the term 'scaffolding' to describe tutorial interaction between an adult and a child. The metaphor was used to explain the nature of support that could be provided by an adult to enable a child to bridge the gap between actual and potential development. This support should gradually be removed as the learner achieves success. Consequently, the nature of teacher-student interaction becomes a dynamic process with the teacher constantly predicting and reviewing when support is needed, how much is required, the nature of the support that is required and how to progressively dismantle the scaffolding that has been put in place.

Vygotsky's theory posits that learning and development are social and collaborative activities that cannot be taught or transmitted to be passively received. Burner (1996) and Feuerstein's work (Feuerstein, Klein, & Tannenbaum, 1994) are closely aligned with Vygotsky's theory. For Bruner and Feuerstein, learners actively create their own meanings and understandings. The role of the teacher is crucially important to create the appropriate activities and experiences that would support or 'scaffold' optimal learning. The main purpose of teaching is to help learners realise their potentialities by reaching as far as they can within the limits of their zone of proximal development. The aim is "not so much at the ripe but at the ripening functions" (Vygotsky, 1962, p. 104). Within such a framework, constructivist classrooms fundamentally differ from the traditional ones. A comparison between both traditional and constructivist classroom is provided next in table 2.3.

Traditional Classrooms	Constructivist Classrooms
Curriculum is presented parts of whole, with emphasis on basic skills.	Curriculum is presented whole to parts with emphasis on big concepts.
Strict adherence to fixed curriculum is highly valued.	Pursuit of students' questions is highly valued.
Curricular activities rely heavily on textbooks and workbooks.	Curricular activities rely heavily on primary sources of data and manipulative materials.
Students are viewed as 'blank slates' onto which information is etched by the teacher.	Students are viewed as thinkers with emerging theories about the world.
Teachers generally behave in didactic manners, disseminating information to students.	Teachers generally behave in an interactive manner mediating the environment for students.
Teachers seek the correct answer to validate students' learning.	Teachers seek the students' points of view in order to understand students' present conceptions for use in subsequent lessons.

Assessment of students' learning is viewed as separate from teaching and occurs almost entirely through testing.	Assessment of students' learning is interwoven with teaching and occurs through teachers' observations of students at work through student exhibitions and portfolios.
Students primarily work alone.	Students primarily work in groups.

Table 2.3: A Comparison between Traditional and Constructivist Classrooms

From Brooks and Brooks (Brooks & Brooks, 1999, p. 17)

Both Piaget and Vygotsky set the foundation of constructivism in education through their theories. They did not, however, offer a precise pedagogical approach as their theoretical framework is descriptive rather than prescriptive (Brooks & Brooks, 1999; Coll & Taylor, 2001; Marlowe & Page, 1998). While these theories have been around for many decades and have taken hold of the thought and imagination of educational reformers in many countries (e.g. Egypt and Scotland), the extent to which they reformed practice is, however, debatable.

2.6.3 Transitions from Behaviourism to Constructivism: A Dichotomy of '*either or*' or may be '*both and*'

One interesting feature of Kuhn's (1970) theory is what he refers to as the "incommensurability of the pre- and post- revolutionary normal-scientific traditions" (p. 148). Adherents of a new paradigm adopt an altered conceptual framework, prescribing a new way of observing, reflecting on, and describing the world. Kuhn held that the effect of a paradigm shift is to produce a divided community of researchers no longer able to debate their respective positions, owing to fundamental differences in terminology, conceptual frameworks and views on what constitutes legitimate questions of 'science'. As a result of these shifts, the field gets balkanised into a number of smaller communities, each utilising different research practices and espousing largely incommensurable views of learning and instruction (Koschmann, 1996). Given that social constructivism presents a gestalt-like shift in reference to the deeply grounded views of the previous paradigm, the produced 'incommensurability' phenomenon becomes particularly evident in the ongoing debate between *theory* and *practice* which will be discussed in more detail in the next chapter.

This elicits another interesting issue. "Is there a dichotomy of 'either or' or perhaps 'both and' that exist between the two paradigms?" Put differently, is it either 'behaviourism' or 'constructivism', rather than a bit of both? The literature on teachers' beliefs is replete with studies where researchers categorise the differences in beliefs of teachers as either behaviourist (transmissionist) or constructivist: a detailed review of this literature will be presented in (Chapter Four). Such a dichotomy is useful in terms of enabling researchers to clearly categorise beliefs. However, it should be noted that it might be simplistic and misleading. There are three reasons as to why this proposition is made. The first is that constructivism as a theory of learning, "has many faces" (Perkins, 1999). It is so diverse and open to interpretations (Ernest, 1995) that it would be questionable whether or not sets of beliefs can be categorised in terms of a behaviourist/constructivist dichotomy. The second is that constructivism is a new theory and many of its implications have not yet

been made clear. While constructivist views of learning may be well developed, this is not the case with constructivist views of teaching (Prawat, 1992b). The third is related to the nature of beliefs. As will be more fully discussed in the next chapter, teachers' beliefs themselves are complex, sometimes contradictory and as such resist concise classification.

Klien (1996), for instance, in his study of pre-service teachers, argues that teachers' beliefs can be both eclectic and contradictory. Pre-service teachers appear to hold both transmissionist as well as constructivist views. The majority of the 279 pre-service teachers who participated in his study endorsed a view of learning that embraced both constructivist and transmission-oriented themes. While they agreed with the study's constructivist items, they did not simultaneously reject a transmissionist view of teaching. Klein concludes that while "constructivism denotes a set of related beliefs for some educational theorists, these same beliefs appear independent of one another to many students" (p.369). He adds that many pre-service teachers hold contradictory sets of beliefs depending on the context and that these beliefs reflect, at the same time, a constructivist and transmissionist philosophy. Klien explains these findings by suggesting that beliefs "are not organized into a coherent body of knowledge" (p.370) or indeed that the pre-service teachers manage in some way to reconcile the different approaches, themes or philosophies.

Perkins (1999) in his *The many faces of constructivism* endorses the use of both paradigms in what he calls 'pragmatic constructivism'. He argues that the 'complications' ideological constructivism encompasses make it important to deploy constructivist-teaching techniques wisely that is in the right place for the right purpose. In his view, constructivism is like "toolbox for problems of learning" (p. 11). Depending on the problem learners encounter due to their knowledge being 'inert, ritual, conceptually different, or foreign', teachers are encouraged to use constructivist-teaching techniques to address them. He puts it as follows,

> Troublesome knowledge of various kinds invites constructivist responses to fit the difficulties – not one standard constructivist fix. If a particular approach does not solve the problem, try another – more structures, less structured, more discovery oriented, less discovery oriented, whatever works. And when knowledge is not particularly troublesome for the learners in question, well, forget about active, social, creative learners. Teaching by telling may serve just fine. (p. 11)

Answering the question of 'which epistemological paradigm should guide educational change?' does not represent a simple case of adopting one and abandoning the other. In education, there is a room and need for both (Caine & Caine, 1997c). Yet, the nature and needs of the today's reality along with evidence from cognitive and neuropsychological research recommend alignment with constructivism as the dominant way of thinking and teaching. Indeed, constructivist teachers can – with their rich and complex teaching conceptions, educational beliefs and instructional repertoire – not only subsume behaviourist-teaching practices, but also go beyond them to foster learning for self-actualisation and for personal development. This is more fully discussed in the following chapter.

2.7 Conclusion

So far in this chapter, the paradigmatic shift education has undergone is presented. In such a shift, the zeitgeist of the 21st century moves away from objectivism to favour social constructivism as the dominant epistemology. Educational reform and system change, therefore, seem inevitable to set 'education on the edge of possibilities' (Caine & Caine, 1997c). For effective educational change to take place, it is essential to endorse a new way of thinking informed by new sciences and research. Yet, as Albert Einstein puts is "the significant problems we face cannot be solved at the same level of thinking we were at when we created them". All educational issues need, therefore, to be reconceived in terms of the nature and needs of the reality of today and tomorrow.

System change requires educator change, and educator change is a matter of personal transformation. In the heart of such a change is challenging a set of compelling deeply held beliefs about learning, teaching and about the nature of reality itself. Buckminster Fuller (1895 -1983) used to say that you should never try to change the course of a great ship by applying force to the bow. You should not even try it by applying force to the rudder. Rather you should apply force to the trim-tab. A trim-tab is a little rudder attached to the end of the rudder. A very small force will turn it left, thus moving the big rudder to the right, and the huge ship to the left. Beliefs are the trim-tab of the great ship sailing to the constructivist paradigm. A challenging and necessary journey is required to find new beliefs match to the turbulent nature of today's systems and reality. The next chapter, therefore, looks at beliefs in more detail with the aim of understanding their nature and their place as a mechanism for change.

Chapter Three

Beliefs About Teaching and Learning to Teach

3.1 Introduction

The conceptions individuals hold about the nature of knowledge and the process of knowing have been the focus of many research studies. They have been given various labels including epistemic beliefs (Bendixen, 2002; Bendixen, Schraw, & Dunkle, 1998), epistemological beliefs (Schommer, 1990), epistemological stances (Fitzgerald & Cunningham, 2002), epistemological thinking (Kuhn & Weinstock, 2002), epistemological theories (Hofer & Pintrich, 1997), reflective judgement (King & Kitchener, 1994), epistemological reflection (Baxter Magolda, 1992, 2001), epistemological resources or repertoires (Hammer & Elby, 2002), ways of knowing (Belenky et al., 1986) amongst others. Such diverse areas of investigation are part of a larger body of work categorised by Hofer & Pintrich (1997) as 'personal theories' and by Hofer (2004b) as 'personal epistemology'. Personal epistemology is a field that examines "what individuals believe about how knowing occurs, what counts as knowledge and where it resides, and how knowledge is constructed and evaluated" (Hofer, 2004b, p. 1). Hofer (2002) also defines epistemology as being "concerned with the origin, nature, limits, methods, and justification of human knowledge" (p. 4).

The study of epistemological beliefs has attracted a great deal of attention in the twentieth century by scholars such as John Dewey, William James, and Charles S. Pierce. Most of the writing has been philosophical in nature rather than empirical. However, most models that contribute to the current epistemological understanding are traced back to Perry's (1970) initiative and empirical investigations in the late 1960s. Until very recently, the study of personal epistemology has held what Kuhn & Weinstock (2002) describe as "more or less orphan status" (p. 121) in the field of developmental, cognitive, and educational psychology. In the last decade, however, there has been much written on this topic as indicative of the dramatic growing interest. Books (Hofer & Pintrich, 2002) and special issues in core journals such as *Educational Psychologist* (Hofer, 2004a) and, *Educational Psychology Review* (Sinatra, 2001), *Journal of Adult Development* (Commons, 2004) have been devoted to comparing a variety of epistemological perspectives. Also a number of researchers have examined the structure of epistemological beliefs (Duell & Schommer, 2001) and how these beliefs are related to, for example, learning (Hofer, 2001; Schommer, 1990), learning and motivation (Hofer & Pintrich, 1997), and other cognitive processes (Kardash & Scholes, 1996; Ryan, 1984b). Nevertheless, there is an obvious confusion in the literature as to how researchers approached and studied the work of Perry, either from the perspective of personal epistemology or from that of attitudes. This has led to conceptual ambiguity and complexity in understanding the construct of personal epistemology (Hofer, 2004b; Hofer & Pintrich, 1997; Kuhn, Cheney, & Weinstock, 2000; Kuhn & Weinstock, 2002; Munby,

Russell, & Martin, 2001). This is one of the possible reasons as to why there has been such a delay and limited interest in the topic.

The first three sections of this review, therefore, aim at sharpening the conceptual understanding of the construct of personal epistemology. This includes an attempt to define this construct. In doing so, the following topics are discussed: nature or form of the construct, contents as well as components of the construct. Reasons as to why this confusion came about are stated. This part ends with a discussion of how Perry's work is approached in the current study and the reasons behind that choice. The following sections look more deeply into beliefs in general and pre- and in-service teachers' beliefs about learning and teaching in particular. The following topics are discussed: defining beliefs, distinguishing among beliefs, attitudes and knowledge, the importance of the role beliefs play in learning to teach and teaching, the formation of beliefs, the nature and mechanism of belief change, and beliefs and classroom practices.

3.2 Defining Personal Epistemology

In their comprehensive review, Hofer & Pintrich (1997) noted that,

> Defining the construct [of personal epistemology] based on existing research is problematic, as there are discrepancies in naming the construct as well as in defining the construct, to the extent that it is sometimes unclear to what degree researchers are discussing the same intellectual territory. (p. 111)

The lack of a unified terminology does seem the result of its study being drawn from diverse research traditions, paradigms, and disciplines. Personal epistemology research has been conducted by educational, developmental, and instructional psychologists, as well as researchers in the area of higher education, counselling, science and mathematics education, reading and literacy studies, and teacher education. Although this diversity of interest has helped the recent dramatic growth in both theory building and empirical research in this field, the results have appeared in disparate locations and the construct, consequently, has been differently labelled (Hofer, 2002, 2004b).

Moreover, the attempts at defining the construct have invariably ended up by promoting ever more models each with distinct levels defined by multiple dimensions and complex coding systems for assessing an individual's level. Examples of these models are illustrated in the fifth chapter. These attempts at definition have also tended to employ new terms that describe almost the same thing. As a result any interest in seeking an overview of the development of personal epistemology seems like a confusing complicated undertaking (Kuhn & Weinstock, 2002). The concern is that such diverse usage of labels suggests that all the different models might not be concerned with the same construct or might not define the boundaries of the construct in the same way (Hofer & Pintrich, 1997; Pintrich, 2002).

Only in the last decade has this work gained the attention of educational psychologists, there has been much discussion across disciplines and a common recognition of the need for a more unified approach with agreed terminology (Hofer, 2002, 2004b; Hofer & Pintrich, 1997).

3.2.1 Nature or Form of the Construct of Personal Epistemology

Hofer & Pintrich (1997) noted that researchers seem to vary in approaching the construct as either (a) a cognitive developmental structure, (b) as a set of beliefs or attitudes that affect cognitive structure, (c) a cognitive style, or (d) a cognitive process in itself. Each perspective signifies different theoretical assumptions about both the nature of the construct and its function. Differences in terminology reflect these more fundamental differences in the construct.

Terms like *epistemological development* (Boyes & Chandler, 1992; Perry, 1981) and *epistemological assumptions* (King & Kitchener, 1994) vary as to the components of epistemological thinking. They, however, express the construct as a logically sequenced, structurally coherent developmental process and assume a more stage-like unitary central structure. This implies that the components are not separable or orthogonal dimensions (Hofer & Pintrich, 1997), are closely related and show similar changes over time – even allowing for the perpetual occurrence of horizontal decalage* (Pintrich, 2002).

The terms *epistemological standards* or *epistemological attitudes* (Ryan, 1984a, 1984b) and *epistemological beliefs* (Schommer, 1994a) reflect conceptualisation where epistemological cognitions and beliefs are perceived as orthogonal and do not necessarily cohere into a stage-like structure.

The term *epistemological style* (Martin, Silva, Newman, & Thayer, 1994) suggests beliefs about epistemology as a trait-like stable individual difference (Hofer & Pintrich, 1997).

Epistemological thinking is considered as cognitive process as in Kitchener's (1983) epistemic cognition, Baxter Magolda's (1992) epistemic reflection and Belenky et al.'s (1986) ways of knowing. It has also been studied with argumentation skills (Kuhn, 1991) and reasoning about ill-structured problems (King & Kitchener, 1994) and critical thinking (Ivanitskaya, Clark, Montgomery, & Primeau, 2002; Thoma, 1993). This seemed to confuse the definition of the construct concerning the differences between epistemological assumptions about the process of knowing and reasoning processes in general. Studying them together has been meaningful, but they can be differentiated conceptually (Hofer & Pintrich, 1997). The difference between both can also help to further identify the construct.

As in all models on epistemological beliefs and thinking, there are two aspects about the nature of knowing. The first includes beliefs about the source of knowledge (authority

* A phenomenon that describes within-stage gaps that is the inability of an individual in a certain advanced stage to apply this mode of thinking to wider range of content areas.

given or self-constructed processes). The second is concerned with the role of evidence and justifying knowledge. Such aspects involve "cognitive processes of a higher level than simple inductive reasoning or general critical thinking" (Hofer & Pintrich, 1997, p. 117). In Kitchener's (1983) proposed three-level system of cognition, epistemological thinking is placed in the third level. Level one includes *cognition*, which consists of cognitive processes such as decoding, remembering, etc. that are often automated, require few resources and function efficiently regardless of the individual's epistemological beliefs. Level two, on the other hand, consists of executive knowledge that coordinates and regulates level one and is named *metacognition*. The third level is epistemological thinking and beliefs. It consists of thinking and decision making that cannot happen without reference to personal beliefs or evaluation.

3.2.2 Contents of Personal Epistemology

In defining the construct, a key issue becomes the identification of the core or essence of personal epistemology and the exclusion of related yet peripheral constructs. All of the models on epistemological thinking agree that central to personal epistemology are cognition and beliefs about:

- the certainty of knowledge (whether it is dualist, multiplist or relativist),
- the simplicity of knowledge (whether it is simple and concrete or complex, contingent and context-bound),
- the source of knowledge (whether it is external authority or personal voice), and
- the justification of knowing (criteria for making knowledge claims, use of evidence, use of reasoning)

(Hofer & Pintrich, 1997)

The disagreement between the models centres on two issues. First, whether or not all of these elements are essential components of personal epistemology and second, the relative importance of these components (Hofer, 2002; Hofer & Pintrich, 1997; Pintrich, 2002). A comparison of the components of the existing models of epistemological beliefs is presented in Appendix 3.1.

Despite this general consensus, some models dissent from this proposition by claiming that certain components cannot be separated artificially from the core. For example, cognitions and beliefs about the nature of learning, intelligence, instruction, classrooms, domain-specific beliefs about discipline, and beliefs about self (Hammer & Elby, 2002; Qian & Pan, 2002; Schommer, 1994b, 2002; Schraw, Bendixen, & Dunkle, 2002; Wood & Kardash, 2002) are so intimately related to beliefs about learning that they cannot be excluded. The advocates of this viewpoint believe that as individuals engage with the nature of knowledge and knowing and how knowledge is acquired, their perceptions about the nature of instruction and classrooms are also activated or evoked. Beliefs, therefore,

about components such as intelligence, instruction and the self seem inextricably linked to the core.

It is unclear, however, whether or not these beliefs constitute genuine epistemological dimensions. Hofer and Pintrich (1997) argue that such beliefs should be considered peripheral for three reasons. First, they do not explicitly deal with the nature of knowledge and knowing in terms of how knowledge is defined and justified. Second, they are not represented in all of the models (see Appendix 3.1) and 'epistemological beliefs' should be limited "to individuals' beliefs about knowledge and knowing as well as reasoning and justification processes regarding knowledge" (p. 116). Third, their inclusion will not lead to conceptual clarity or to a coherent and cumulative body of knowledge about the development of epistemological thinking (Pintrich, 2002): multiple and varying definitions make it difficult to summarise, compare developmental trends and develop generalisations across research studies. Despite Hofer and Pintrich's (1997) reservations, it is difficult to deny that beliefs about learning and teaching are related to how knowledge is acquired and, in terms of the psychological reality of the individual, beliefs about learning, teaching and knowledge are intertwined together.

Pintrich (2002) suggests an interesting way of proceeding on this definitional problem by proposing the development of theoretical models that explicitly develop the logical and conceptual links between all potential components. Such models would give a clearer picture as to how the core and peripheral components are cognitively represented by the individual. For example, it could be that cognitions and beliefs about knowledge and learning have a more unitary (stage-like) central conceptual structure and are closely related as they show similar changes over time. Alternatively, it could be that components such as knowledge and learning be presented as two relatively independent dimensions, or separable structures or 'schemas', or distinct 'nodes' in a network of cognitions and beliefs. A third proposition may then be that components such as knowledge and learning are so closely related that activation of one schema or (node) also activates other nodes. In any way, very little theoretical work has been conducted as to the nature of representation of these beliefs. There is also a need for the application of more recent cognitive psychological models to the area of epistemological thinking.

Pintrich (2002) states that in the end it may simply have to rest on the personal choice of the researchers in terms of how they conceive of their theory and model. Until there is new empirical evidence to sway the status quo favouring one view over the other, the key issue of what constitutes an individual's 'personal epistemology' remains an unsettled debate and open for further research.

3.2.3 Components of Personal Epistemology

Pintrich (2002) in his comprehensive review noted that there are three general perspectives on the number and independence of components of personal epistemology. Each

perspective reflects a classic underpinning 'meta-theory' on the nature of development: developmental, cognitive and contextual.

Developmental models represent one end of a continuum. Such models have a cognitive organismic view of development that favours a more qualitative, unitary, holistic view of epistemological thinking. The different aspects of epistemological thinking and beliefs tend to cohere into *a single* position, stage, level, or phase that reflects an individual's qualitatively different way of seeing the world. Such a perspective tends to reject the idea of multiple independent components of development as proposed by cognitive models.

The centre ground of the continuum is taken by the cognitive approach to epistemological thinking. It has a more mechanistic meta-theory to development that allows for multiple independent components. The number of such components, however, varies from one model to the other. Pintrich (2002) suggested a range of components or dimensions: "more than one and less than ten" (p. 394). From this perspective, horizontal decalage can happen and can be predicted as individuals' positions on any of the dimensions could vary as a result of situational or contextual features. Despite these variations, there is an overall general conceptual structure and tendency for the individual to make sense of the world.

The other end of the continuum is represented by the perspective of contextual resources and situated meta-theory. Such a perspective proposes many different epistemological resources that individuals draw on as they think and reason in everyday life. Hammer and Elby (2002) map the construct in four categories of resources. Within each they list over 25 resources that may be used in epistemological thinking. Most importantly, not all of them are activated or invoked. This more contextualist situated perspective would suggest that the number and type of epistemological resources vary from one context to another depending on the features of each.

In the interest of parsimony, Pintrich (2002) urges the need for more research that aims at describing the underlying representations or cognitive structures of epistemological thinking and beliefs. With carefully chosen methodologies to provide more evidence, the issue of intraindividual stability of dimensions and contextual sensitivity could be made clearer. Pintrich concludes, "... given some basic incommensurability in the underlying meta-theory, there will always be some theoretical choices to be made by individual researchers" (p.398).

Each of the themes discussed above has generated its own stream of research and theoretical debate. It is, however, important to remember that none of these debates has been settled. These three lines of research are alive and warrant additional research and discussion (Schraw, 2001).

It is important, however, to note that the inclusion of learning and teaching as components of personal epistemology seems to have stemmed from Perry's early focus of inquiry where he included a wide range of components to understand student perception of their university experiences. He mentions epistemology as part of his scheme of 'intellectual

and ethical development', which is seen as encompassing the ways in which students make meaning of their experiences. Subsequent work and measures built on Perry's scheme veered away from the focus on the epistemological dimension. Instruments used to measure the Perry scheme like – for example – Moore's LEP 'Learning Environment Preferences' and Baxter Magolda's MER 'Measure of Epistemological beliefs' seem to confound epistemology with perceptions of learning and instructional preferences.

It is essential to state that in the current study, Perry's work is approached as perceptions of learning and teaching. This viewpoint is adopted for all of the above-proposed reasons. These perceptions are believed to reflect the tacit assumptions by which individuals make meaning of their learning experiences. They transcend and subsume the individual's epistemological beliefs and thinking. This is convenient for the purpose of this study: to explore pre- and in-service teachers' perceptions, understanding and making sense of various aspects of their educational teaching experiences.

The application of epistemological models to beliefs of teachers has not been as systematic or pervasive as it has been in the research on student conceptions and learning (Patrick & Pintrich, 2001; Schraw & Olafson, 2002). Schraw & Olafson (2002) noticed that "virtually all" (p. 3) of the research has focused on what students know and believe and how that affect, for example, their approaches to learning, attitudes, assessment format preferences, achievement, comprehension, and their critical thinking abilities. This emphasis might be explained, as adolescence and early adulthood – upper school and university years – are perceived as periods when epistemological development is most likely to take place.

Very little has been said thus far about the role of teachers' epistemological thinking and beliefs and how they affect classroom practices. However, it is vital to extend research to include teachers' beliefs in order to study the impact such beliefs have on their thinking, planning, teaching and classroom practices in general. Since there is paucity of empirical evidence for what precisely fosters epistemological development or how epistemological beliefs are altered, the focus of the second part of this review is on the role of beliefs in teaching and learning to teach. The assumption is that these beliefs act as an umbrella under which epistemological beliefs are subsumed.

3.3 Beliefs about Learning to Teach and Teaching

3.3.1 Defining Beliefs

Teachers' beliefs are considered important in understanding their thought processes and behaviours. The assumption is that beliefs are the best indicator of the decisions individuals make throughout their lives (Bandura, 1986; Nespor, 1987; Pajares, 1992; Rokeach, 1968). Pintrich (1990) suggested that beliefs ultimately proved the most valuable psychological construct in relation to teacher education. Kagan (1992) also stated that "the more one reads studies of teacher belief, the more strongly one suspects that this piebald form of personal knowledge lies at the very heart of teaching" (p.85). Nevertheless, the interest of educators and researchers in studying beliefs has been, until recently, implicit in

educational practice and research endeavours. Indeed, studies aimed at understanding teachers beliefs have been scarce (Nespor, 1987; Pajares, 1992; Richardson, 1996; Thompson, 1992). Nespor (1987) argued that,

> ...in spite of arguments that people's "beliefs" are important influences on the ways they conceptualise tasks and learn from experience...little attention has been accorded to the structure and functions of teachers' beliefs about their roles, their students, the subject matter areas they teach, and the schools they work in. (p.317)

Although this comment was made some 19 years ago, it still has resonance today. *'Beliefs'* has been a particularly slippery term in the psychological and educational literature (Hofer & Pintrich, 1997). It is considered as a global mysterious construct that can never be clearly defined, empirically investigated or made a subject of research. It is often seen as a concern for areas like philosophy and religion rather than psychology or education. The fact that beliefs are now studied in range of diverse fields has resulted in a variety of meanings determined by the agendas of researchers. Educational research seems particularly unable to adopt an agreed on working definition. For this reason, it becomes essential to specify what is meant by beliefs, and how it can be identified as different from other closely related constructs.

3.3.2 Beliefs as Distinguished from Attitudes and Knowledge

Pajares (1992) claims that,

> All words begin as servants, eager to oblige and assume whatever function may be assigned them, but, that accomplished, they become masters, imposing the will of their predefined intentions and dominating the essence of human discourse. It is for this reason that articulate conversations must define not only clarity of thought and expression but also preciseness of word choice and meaning. (p. 308-309)

Beliefs as a big construct subsuming epistemological beliefs does seem to suffer the abuse caused by the lack of precision and clarity. In the literature the same construct is often labelled with different aliases such as: attitudes, values, perceptions, conceptions, conceptual systems, preconceptions, implicit theory, explicit theory, personal theories, intuitive conceptions, internal mental processes, mental models, images, perspectives, orientations, repertories of understanding, stances, judgements, axioms, opinions, ideology, and the rest.

In studies of teachers' beliefs, the "bewildering array of terms" (Clandinin & Connelly, 1987, p. 487) continues with different terms describing the same construct including action strategy, rules of practice, principles of practice, social strategy, tacit knowledge, teaching criteria, personal construct/ theories/ epistemology, practical knowledge, and personal practical knowledge. The centre of confusion seems to be the distinction between attitudes and beliefs on the one hand and beliefs and knowledge on the other. Aiming for

clarification, a differentiation between these terms is accordingly described. Yet, it is important to emphasise at the outset that the purpose of this exercise is not to provide a comprehensive critique or justifications of the different views in the literature, but to revisit briefly the arguments so as to demonstrate the complexity of this venture and to state what terms are used in this study and the reasons behind choosing them.

3.3.2.1 Attitudes

As a theoretical construct, attitudes have a long and complex history (Oppenheim, 1966, 1992) and are thought to have many dimensions (Hogg & Vaughan, 1995). The details of this go beyond the purpose of this chapter but a brief account of it is discussed.

Thurstone (1931) first defined it as "the affect for or against a psychological object" (p.261). In (1957), Edwards reiterated such a view: an attitude is "the degree of positive or negative affect associated with some psychological objects" (p. 2). Other definitions of Katz & Sarnoff (1954) talked about a stable or fairly stable organisation of affective processes and Triandis (1971) spoke of an attitude as an idea charged with emotion. These 'one-component' definitions of attitude stress the centrality of affect (like or dislike) as a dominant feature of attitudes.

Rhine (1985) considered an attitude as a concept with an evaluative dimension. Katz & Stotland (1959) defined it as a predisposition to evaluate in terms of verbal statements of goodness-badness. Osgood, Suci, & Tannenbaum (1957) considered an attitude as synonymous with evaluative dimension of the semantic space. Chaiken & Eagly (1993) described it as a psychological tendency that is expressed by evaluating a certain entity with some degree of favour or disfavour. Though evaluation (presumably included in cognition) and affect can be distinguished from each other, in the context of these definitions, they are assumed to go together to produce a favourable or unfavourable attitude. These definitions, therefore, emphasise that an attitude predisposes one to make a preferential response: an affective and/or evaluative one.

Allport's (1935) definition of attitudes as "a mental and neural state of readiness, organized through experience, exerting directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (p. 8) favours a 'two-component' perspective of an attitude. First, attitude is an implicit predisposition that, second, has a generalising and consistent influence on evaluative (judgemental) responses. Likewise, Ajzen (1988) identifies an attitude as "a disposition to respond favourably or unfavourably to an object, person, institution, or event" (p. 4). In this sense, attitudes have strongly influenced teaching and teacher education for a number of years.

Another view of defining attitudes is the 'three-component' model. Many researchers (Breckler, 1984; Himmelfarb & Eagly, 1974; Johnstone & Reid, 1981; Krech, Crutchfield, & Ballachey, 1962; Ostrom, 1968; Reid, 1978; Rosenberg & Hovland, 1960) adopt the 'trinity' of cognitive, affective and the behavioural aspects. Klausmeier (1985), for example, describes attitudes as "learned emotionally toned predisposition to behave in a

consistent way toward persons, objects, and ideas. Attitudes have both affective and an informational component" (p. 403).

Fishbein (1976), however, suggests that the notion of attitudes consisting of three components – affective, cognitive and conative (action) – led to conceptual confusion because the three components were not always correlated with each other in empirical studies of individuals' attitudes. To deal with this problem, Fishbein limited the term *attitude* to the affective component, the cognitive to beliefs about the objects and designated the conative to beliefs about what should be done concerning the object. Attitudes, for Fishbein, are defined as "learned predisposition to respond to an object or class of objects in a favourable or unfavourable way" (p. 257). The view of affect as the overriding dimension of attitude is more common and is shared by many researchers. As Krech and Crutchfield (1948) put it, "... attitudes can be designated as either 'pro' or 'anti' while beliefs are conceived of as 'neutral'. We speak of a pro-British attitudes or an anti-Russian attitude, but we do not speak of pro or con when we are describing a man's beliefs about the spherical nature of the earth" (p. 153).

Richardson (1996) in her review also adopts this distinction. She states that the paradigmatic shift in both social psychology and educational psychology drew interest away from the affective (attitudes) toward the cognitive (beliefs). Beliefs, therefore, have taken over as a major interest in studying teacher's ways of thinking and classroom practices. However, such a distinction remains unclear especially in the empirical literature where one study's *beliefs* resemble *attitudes* in other studies. So the question then is 'how beliefs are defined in the literature?'

3.3.2.2 Beliefs

The concept '*beliefs*' is included in some attempts to define attitudes. Shaw and Wright (1967), for example, define an attitude as "A set of affective reactions towards the attitude object, derived from concepts or beliefs that the individual has concerning the object, and predisposing the individual to behave in a certain manner towards the attitude object" (p. 13). Similarly, Rokeach (1968) defines attitudes as "a relatively enduring organization of beliefs around an object or situation predisposing one to respond in some preferential manner" (p. 112).

Beliefs in these definitions are incorporated within the overall attitude construct. This view departs from the widely held distinction mentioned above between beliefs and attitudes, namely that beliefs are conceived of as having only the cognitive, 'neutral' component, while attitudes have the affective components (Rokeach, 1968).

Dewey (1933) described belief as the third meaning of thought, "something beyond itself by which its value is tested; it makes an assertion about some matter of fact or some principle or law" (p. 6). He added that the importance of belief is crucial, for "it covers all the matters of which we have no sure knowledge and yet which we are sufficiently

confident of to act upon and also the matters that we now accept as certainly true, as knowledge, but which nevertheless may be questioned in the future" (p. 6).

Goodenough (1963) describes beliefs as propositions that are held to be true and are "accepted as guides for assessing the future, are cited in support of decisions, or are referred to in passing judgement on the behavior of others" (p.151). Nisbett and Ross (1980) wrote of beliefs as "reasonably explicit 'propositions' about the characteristics of objects and object classes" (p. 28). Rokeach (1968) defines beliefs as "any simple proposition, conscious or unconscious, inferred from what a person says or does, capable of being preceded by the phrase, 'I believe that...'" (p. 113). Beliefs are, then, thought of as psychologically held understandings, premises or propositions about the world that seem to be true (Richardson, 1996). It, therefore, connotes a personal conviction, or an unverified or unexamined opinion, and not necessarily a reasoned cognitive structure (Schommer, 1994b). Beliefs may be descriptive, evaluative, or perspective, but elements of each are present in most beliefs and are prepositions for action (Rokeach, 1968).

Many researchers share the view of beliefs as inducing action. Brown and Cooney (1982), for example, explained that beliefs are dispositions to action and major determinants of behaviour. Likewise, Sigel (1985) defined beliefs as "mental constructions of experience – often condensed and integrated into schemata or concepts" (p. 351) that are held to be true and guide behaviour. Harvey (1986) defined beliefs as an individual's representation of reality that has enough validity, truth, or credibility to guide thought and behaviour. Rokeach (1968) argued that all beliefs have a cognitive component representing knowledge, an affective component capable of arousing emotion, and a behavioural component activated when action is required. He cautioned that understanding beliefs requires making inferences about individuals' underlying states. Beliefs cannot be directly observed or measured but must be inferred from what people say, intend to do, and do. Such qualities have important implications for methodology and measurement discussed later on in this chapter.

Rokeach (1968) argues that "beliefs are predisposition to action, and an attitude is thus a set of interrelated predispositions to action organized around an object or situation" (p. 113). Beliefs then are thought of as the basic unit constituting an individual's attitude. Kerlinger (1967) pointed out that they are the "criterial referents" (p. 111) that have to be shared if two individuals are said to have the same attitude. Eisenhart, Shrum, Harding, & Cuthbert (1988), similarly, expressed the same view saying, "a belief is a way to describe a relationship between a task, an action, an event, or another person and an attitude of a person towards it" (p. ix).

In his structure of the belief system, Rokeach (1968) believes that beliefs are "organized in a psychological but not necessarily logical form" (p. 2). He writes that some beliefs are more central and therefore more difficult to change than others. Green's (1971) philosophical approach to describing beliefs provided an understanding of how humans can hold incompatible or inconsistent beliefs. From his perspective, beliefs are held in

clusters, and each cluster within the belief system may be protected from other clusters. This explains how people may hold incompatible beliefs together as long as there is little cross-fertilisation among the belief system. This incompatibility may remain if beliefs are never set side by side or never examined for consistency. This view does provide explanation for what in the epistemological literature called 'domain-specific beliefs' and 'horizontal decalage' where individuals compartmentalise their beliefs about knowledge when related to, for example, science and arts subjects.

Rokeach (1968) and Abelson (1979) also subsume knowledge as a component of beliefs. Yet, other cognitive researchers' (Nisbet & Ross, 1980) description of generic knowledge subsume beliefs as a type of knowledge. This is indicative of the general state of confusion and reflects perhaps the most complex issue in current research on teaching and teacher education. It is the distinction between these constructs – beliefs and knowledge – which is described next.

3.3.2.3 Beliefs and Knowledge

In discussing teaching and learning, the argument regarding the relationship between knowledge and beliefs is fundamental. Pajares (1992) describes distinguishing knowledge from beliefs as a "daunting undertaking" (p. 309). The difference between the two constructs is "in degree and not kind" (p. 311). Questions like 'what does it mean to know, to believe, where does knowledge end and belief begin?' are at the heart of the research on teaching. Knowledge is defined as "an individual's personal stock of information, skills, experiences, beliefs and memories" (Alexander, Schallert, & Hare, 1991, p. 317). It "encompasses all that a person knows or believes to be true, whether or not it is verified as true in some sort of objective or external way" (Alexander et al., 1991, p. 317). Knowledge, in this sense, is often perceived as an overarching category that is inherently incomplete, flawed, and fallible and beliefs are just one segment of an individual's knowledge base. This view contradicts the assumption that, philosophically, knowledge is always defined as *justified true beliefs*. These definitions reflect how difficult it is to draw a precise and clear definition of what beliefs are as distinct from knowledge.

Beliefs, nonetheless, have been distinguished from knowledge in a number of ways. For the purpose of this discussion, only a few distinctive features of the belief systems that seem most pertinent to the study of teachers' beliefs are considered and elaborated here.

Nespor (1987) drawing on Abelson (1979) identified four main features that distinguish beliefs from knowledge. These are a) existential presumption, b) alternativity, c) episodic structure and d) affective and evaluative loading. These are discussed in brief next.

One distinctive feature of beliefs is that they are the existential presumption to which teachers assert the existence or non-existence of entities (Nespor, 1987; Pajares, 1992). In teaching terms, it can mean a strong belief a teacher holds about matters like, for example, 'students who fail are simply lazy', or that 'learning math is a function of drilling'. Pajares (1992) state that teachers' "...believe them because, like Mount Everest, they are there" (p.

309). As such, beliefs are incontrovertible, immutable entities, and taken-for-granted personal truths an individual holds about the physical and social other and self. They are deeply personal, rather than universal, unaffected by attempts of change. They exist beyond individuals' control or knowledge (Pajares, 1992; Rokeach, 1968; Schommer, 1994b). They are learned and can be formed by chance, an intense experience, or a succession of events (Nespor, 1987; Pajares, 1992; Perloff, 2003).

Beliefs also often incorporate a view of an ideal or alternative situation that contrasts with reality. For varying reasons to some individuals, they are considered as personal build-up alternatives to create an ideal situation that differs from reality (Nespor, 1987). For example, traumatic educational experiences at school age, for some teachers, would create ideal alternative teaching environments that affect future teaching practices (Pajares, 1992).

Another interesting characteristics of beliefs is that many researchers (Calderhead & Robson, 1991; Goodman, 1988; Nespor, 1987) claim that knowledge information system is semantically stored, whereas beliefs reside in episodic memory. Nespor (1987) contends that beliefs draw their power from previous episodes or events that filter and colour the internalisation of subsequent events.

Unlike knowledge, beliefs have stronger affective and evaluative loadings. Such affect operates independently of the cognition associated with knowledge (Alexander et al., 1991). Such combinations of affect and evaluation can determine the energy teachers exert on an activity (Bandura, 1986). Other theorists like Nisbet & Ross (1980) conceptualise generic knowledge as a structure composed of a cognitive component, schematically organised, and a belief component, possessing elements of evaluation and judgement. As such, beliefs are viewed as part of the generic knowledge structure. Because beliefs influence how individuals make sense of the world, this structure is held as an unreliable guide to the nature of reality (Pajares, 1992). They are also held with varying degree of conviction. In that respect, Abelson (1979) distinguishes them from knowledge saying,

> The believer can be passionately committed to a point of view, or at the other extreme could regard a state of affairs as more probable than not, as in "I believe that micro-organisms will be found on Mars." This dimension of variation is absent from knowledge systems. One would not say that one knew a fact strongly. (p. 360)

Nevertheless, Pajares (1992) concludes that what these conceptualisations miss is the element that cognitive knowledge must have its own affective and evaluative component. He states that,

> The concept that knowledge is purer than belief and closer to the truth or falsity of a thing requires a mechanistic outlook not easily digested. What truth, what knowledge, can exist in the absence of judgement or evaluation? But, sifting cognition from affect, and vice versa seems destined to this sort of fence straddling. (p.310)

Another distinctive feature of beliefs systems is that, unlike knowledge systems, they are not consensual that is they do not require general or group consensus regarding the validity and appropriateness of their beliefs. As mentioned earlier, individual's beliefs do not require internal consistency within the belief system. Moreover, as Abelson (1979) states, "Semantically, 'belief' as distinct from knowledge carries the connotation of disputability" (p. 356). A common stance among philosophers is that disputability is associated with beliefs, whereas truth or certainty is associated with knowledge. Scheffler (1965) argued that a claim to knowledge must satisfy a truth condition, whereas beliefs are independent of their validity. Thompson (1992) also asserts that agreement about procedures for evaluating and judging validity is a characteristic of knowledge. Knowledge must meet criteria and evidence. Beliefs, on the other hand, are often held or justified for reasons that do not meet those criteria, and, thus are characterised by a lack of agreement over how they are to be evaluated or judged. Nespor (1987) puts it like this,

> Belief systems often include affective feelings and evaluations, vivid memories of personal experiences, and assumptions about the existence of entities and alternative worlds, all of which are simply not open to outside evaluation or critical examination in the same sense that the components of knowledge systems are. (p. 321)

Beliefs, therefore, by their very nature are disputable, more inflexible, and less dynamic than knowledge systems (Pajares, 1992). If knowledge systems are open to evaluation and critical examination, beliefs systems are not. For them to change, it is not argument or reason that alters them but rather a "conversion or gestalt shift" (Nespor, 1987, p.321). Nespor added that belief systems are also unbounded in that their relevance to reality defies logic, whereas knowledge systems are better defined and receptive to reason.

Yet, for all their idiosyncrasies, Nespor (1987) asserts that beliefs are far more influential than knowledge in determining how individuals organise and define tasks and problems and are stronger predictors of behaviour. Many researchers agree that beliefs offer greater insight into individual's behaviour than knowledge. Lewis (1990), however, insists that the two constructs are synonymous, that the most simple, empirical, and observable thing one knows will, on reflection, reveal itself as an evaluative judgement: a belief. Pajares (1992), nonetheless, emphasises the difference arguing that acquiring knowledge may involve cognitive processes that are different from those employed in choosing, developing and maintaining beliefs. Regardless of these conceptualisations, Pintrich (1990) ultimately confirms that research has shown both "knowledge and beliefs...influence a wide variety of cognitive processes including memory, comprehension, deduction and induction, problem solving, and problem solutions" (p. 836).

3.3.2.4 Towards a Consensus

Though the impression of a simple dichotomy portrayed above and adopted by many researchers seems practical, clear definitive lines between teacher knowledge and beliefs are easily lost in conceptual arguments and undoubtedly become blurred when it comes to

classroom practice (Bullough & Baughman, 1997; Gess-Newsome, 1999; Grossman, 1990). This creates a challenge. Making distinction between aspects of teachers' knowledge and beliefs seems convenient for the study of teaching, but flawed in terms of the potential misinterpretation of the dynamic interplay between them (Carlsen, 1991). Nevertheless, Alexander & Dochy (1995) concur, saying, "explicit definitions or explanations of these terms are rarely offered" (p.414). Definitions of each are "basically conventions, general agreements among researchers that a particular term will represent a specific concept" (Pajares, 1992). This agreement depends to a great extent on researchers' epistemological stances and view of the world (Southerland, Sinatra, & Matthews, 2001).

Teacher researchers use both terms interchangeably to indicate what appear similar if not the same construct. It is a recognition that these constructs are "interwined in ways that may not be precisely disentangled but should never-the-less be acknowledged" (Woodbury, Submitted) as cited in (Southerland et al., 2001, p.347). In their conclusion, Southerland et al. (2001) state that it must be noted that "educational researchers have not yet convincingly demonstrated that the two constructs [beliefs and knowledge] are clearly distinct " (p.348) especially if empirical research has shown that both have related effects on measures of comprehension, understanding and learning (Anderson, Reynolds, Schallert, & Goetz, 1977; Garner & Alexander, 1991; Kardash & Scholes, 1996). Greater clarity on this issue is needed. Researchers are required to provide definitions of these constructs in their writing and to conduct empirical investigations aimed at understanding such a relation.

Taking such recommendations into consideration, it is worth stating that in this research the focus of study is pre- and in-service teachers' beliefs. More precisely, the focus of study is their "educational beliefs" (Pajares, 1992, p. 316). As such, this term distinguishes beliefs about education from "beliefs about politics, about abortion, about art... etc" (Pajares, 1992, p. 316). However, the term 'educational beliefs' is itself broad and generic. In the current investigation, it specifically encompasses beliefs about the nature and source of knowledge, beliefs about the role of the teacher, the role of the learner, the role of peers, beliefs about the nature of assessment and ability.

In this respect, it is important to relate beliefs to the other constructs discussed earlier (i.e. attitudes and knowledge) by exploring the relationship among them. The previous discussion of the relevant literature suggests two principles to be agreed on by most researchers. The first is that all of these constructs are somehow connected to one another; the second, these constructs have three components: the affective and evaluative, the cognitive and the behavioural. Among other aspects of differences, part of the controversy is, in some respect, related to the extent each construct have of those components. For instance, whereas beliefs – compared to knowledge – seem to have more of the affective and evaluative loadings, beliefs – compared to attitudes – have less of this component. Although an individual's behaviour is influenced by all of these constructs, it seems that – compared to knowledge – beliefs and attitudes have greater implicit influence on how one perceives the world and responses to various situations. This argument is, of course, too

simplistic as it adopts a theoretical mechanistic outlook that attempts to sift logically what is practically impossible i.e. sifting cognition from affect from behaviour: components that have a complex and interwoven relationship.

To sum up, it can be argued that cognitive knowledge with much affective and evaluative loading forms a belief. Beliefs are the basic unit constituting an individual's attitude. These attitudes collectively form the worldview an individual would hold of the world (Figure 3.1).

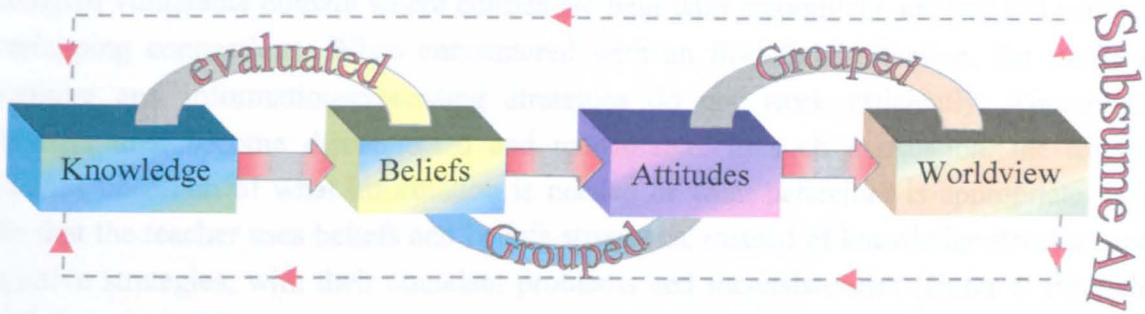


Figure 3.1: The Relationship among Knowledge, Beliefs, Attitudes and Worldviews

Pajares (1992) provides a synthesis of the findings on beliefs he drew from his review of the literature on the topic (Appendix 3.2). For the purposes of this study, beliefs are defined based on the common characteristics described in Pajares' review of the nature of beliefs. These characteristics are as follows:

- Beliefs represent teachers' implicit theories and personal knowledge.
- Beliefs serve as cognitive maps and mediators for experiencing and responding to the environment.
- Beliefs represent a complex inter-related system.
- Beliefs have a cognitive and an affective component.
- Beliefs are often tacit and unconsciously held.
- Beliefs are often taken for granted and unquestionably held.

From these statements, a definition of teachers' beliefs is established as a complex and inter-related system of personal and professional knowledge that serves as implicit personal theories and cognitive maps for experiencing and responding to reality. Beliefs rely on cognitive and affective components and are often tacitly held.

3.3.3 The Importance of Beliefs in Learning to Teach and Teaching

Beliefs are very important when it comes to teaching or learning how to teach. First, from a constructivist perspective, learning is viewed as an active and constructive process that is

greatly influenced by individuals' existing knowledge and beliefs. Such beliefs are brought to a teacher education program and staff development courses. They influence what and how pre- and in-service teachers learn. A review of the literature, detailed later on, shows strong evidence that the images or theories pre- and in-service teachers have about teaching influence the way they approach their courses and what they learn from them, how (and if?) they change and, subsequently, how they teach.

Second, the ill-structured nature of teaching elicits teachers' beliefs and epistemological assumptions (Hofer & Pintrich, 1997). Nespor (1987) describes educational beliefs as an entangled vulnerable domain where entities are held with incomplete, unclear and partially overlapping connections. When encountered with an ill-defined situation, the teachers' cognitive and information-processing strategies do not work efficiently. Appropriate schemata then become disconnected and unavailable. In such a situation, the teacher becomes uncertain of what information is needed or what behaviour is appropriate. It is then that the teacher uses beliefs and beliefs structures, instead of knowledge structure and cognitive strategies, with their attendant problems and inconsistencies (Hofer & Pintrich, 1997; Pajares, 1992).

The third is that, as Richardson (1996) argues beliefs are the focus of instruction. As Green (1971) has stated:

> Teaching has to do, in part at least, with the formation of beliefs, and that means that it has to do not simply with *what* we shall believe, but with *how* we shall believe it. Teaching is an activity which has to do, among other things, with the modification and formation of belief systems. (p.48)

Similarly, the goal of teacher education and professional development programs is to help pre- and in-service teachers to "transform tacit or unexamined beliefs about teaching and learning... into objectively reasonable or evidentiary beliefs" (Richardson, 1996, p. 105), by being aware of their beliefs, identify them and assess them in relation to classroom actions (Fenstermacher, 1979, 1994).

Talking about beliefs and education, another issue is inevitably raised that deserve some thought. It has to do with the fact that ethical concerns have to be considered as to whether education *should* aim to change the beliefs of individuals and as to which beliefs it should promote (Raths, 2001).

Having indicated how beliefs are defined and conceptualised in the literature and discussing their importance, the next section explores the origin of this elusive construct.

3.3.4 The Formation of Beliefs: Where Beliefs Come From

Theorists seem to generally agree that beliefs are created through a process of enculturation and social construction. Van Fleet (1979) points out that this cultural transmission has three components: enculturation, education, and schooling. Similarly,

Richardson's (1996) thorough review pointed out three categories of experience described as influencing the formation of beliefs and knowledge about teaching.

Individuals' *personal experiences* include aspects of life that go into the shaping of their view of the world, of society, of self and, certainly, of schooling. Such experiences are incidental learning processes that are assimilated through observation, participation, and imitation of all the cultural elements present in their personal worlds. These beliefs affect, in turn, learning to teach and teaching. There is a growing research interest in the relationship between teachers' personal life experiences and how they approach teaching. These personal experiences are encoded in images. Such images of teaching have moral, emotional, personal, and professional dimensions. They are used to identify ways in which pre- and in-service teachers think about themselves as teachers and how this relates to their teaching practices (Clandinin, 1986; Connelly & Clandinin, 1988; Goodson & Walker, 1991). Clandinin & Connelly (1991), for example, conducted a case study with an elementary school teacher to understand his beliefs. His upbringing in a tightly knit community seemed to have a great effect on his image of teaching. The image of community affected his approach to involve the community in his school.

Experiences with schooling and instruction are another influential element in forming beliefs. Lortie (1975) argues that the time individuals spent as students observing teachers and complying with teachers' expectation provides prospective teachers with images of teaching that again tend to be ingrained in their belief system. These images are the product of what he coined as "apprenticeship of observation". They are powerful, resilient to change and seem to support tacit ways of thinking and doing.

A number of studies have examined beliefs acquired from such experiences and their effects on teachers' perceptions of their role as teachers. Such studies have echoed Lortie's (1975) views and shown the entering beliefs or 'dispositions' (Raths, 2001) of teachers to have had an influential effect on the professional learning that occurs in initial teacher training and beyond.

Nias (1989a; 1989b), for example, indicated that teachers, though into their ninth year in teaching, still drew on these latent images. In another study of teachers' theories of children's learning, Anning (1988) concluded that theories held by the six teachers who participated in her study were determined "by their own particular previous experiences of teaching and learning in their classrooms" (p.131). In another study, Amarel & Feiman-Nemser (1988) tracked a small number of students through their professional training courses and found that school experiences reinforced their earlier views and had a conservative effect on their thinking and practice. Similarly in Britzman's (1991) case study of two student teachers, they indicated that they held powerful conceptions about their role as teachers, gained from their previous experience of teaching models, that profoundly and consequently affected their classroom practices.

When Calderhead (1987) examined the interpretive framework pre-service teachers employed in their initial education, he found that students often entered their courses with dysfunctional conceptions of teaching. Although the courses provided students with useful knowledge on planning and evaluation, students tended to plateau them and rarely acquired the thinking needed to engage their pupils in the process of thinking. Two longitudinal studies (Hollingsworth, 1989; John, 1991) found that pre-service teachers' beliefs on entering the system served as a filter for processing their experiences. John (1996) in an attempt to understand more about these beliefs explored the implicit theories of forty-two history students on the Post Graduate Certificate in Education's course using in-depth life history interviews (e.g. semi structured interviews and open-ended questions). Findings also indicated the vividness and variety with which pre-service teachers retrospectively recollected their past schooling experiences. Images that have emotional loadings – positive or negative – were the ones that stood out and around which their recollections clustered. They functioned as the lens through which they evaluated current classroom practices. Although Lortie's seminal study was published in 1975, and with the undergoing changes in teacher education, many research studies extensively continue to affirm his views (Agee, 1998; Grossman et al., 2000; Mayher, 1990). Of those studies are Yerrick, Parke, & Nugent (1997) and Haney & McArthur (2002) and Carroll (2005). Lortie's research has, therefore, become part of the vernacular about the state of the teaching profession.

Such studies not only show the longevity of such experiences but also attest to their depth and intensity. Other studies, using biographical and life history methodologies, have shown the effect of biography of personal and schooling experiences is influential in two ways: first they provide clear positive and negative role models (Knowles, 1992) and second, this informal modelling process is highly selective with pre-service teachers using a mixture of approaches and styles culled from their own experiences as students (Ross, 1987). The outcome suggests that apprenticeship of observation is hugely influential in the professional learning process and plays a central role in shaping what pre-service teachers take from their courses of training (Grossman, 1990). Yet, despite this scholarly activity, very little is known about the nature of those pre-training influences and the sorts of variations that exist within and among different subjects areas (John, 1996).

In his review of the literature on teachers' beliefs and knowledge, Calderhead (1996) summarised beliefs related to teaching and learning. He categorises teachers' beliefs in two categories by arguing that some teachers view teaching as a process of knowledge transmission, while others view it as a process of guiding children's learning or as a process of developing social relationships. Teachers' beliefs are greatly influenced by their experiences. Pre-service teachers start with control-oriented belief systems that emphasise the importance of maintaining order and good discipline and guiding the activities of the children. During training, these attitudes become more liberal and child-centred. However, when teachers enter full-time teaching, they once again revert to a control-oriented belief system.

Experiences with formal knowledge are another influence on pre- and in-service teachers' beliefs formation. Richardson (1996) refers to experiences with formal knowledge with respect to subject content knowledge as well as pedagogical knowledge that pre- and in-service teachers experience. It is here that the intertwined confusion between knowledge and beliefs rises to the surface. Knowledge of subject matter, beliefs about the nature of subject matter, how students learn the subject matter, and experiences with formal pedagogical knowledge that usually begin in pre-service teacher education program seem to be of particular importance in the formation of beliefs about teaching. Leinhardt (1988) reported that many elementary teachers tend not to develop a deep understanding of mathematical concepts and fail to see how they fit into the broader mathematical domain. Consequently, the learning experiences these teachers provide children (and were subject to themselves) display various deficiencies, resulting in misconceptions (English & Halford, 1995). John (1991) found that secondary student teachers' planning was significantly influenced by their subject beliefs. The lack of connected, conceptual understanding of the subject matters they are expected to teach affects teachers' planning and classroom teaching. In a review of a line of research on the knowledge of mathematics teachers, Peterson, Fennema, & Carpenter (1991) sum it up saying:

> We were struck both by the influence of teachers' knowledge on their thinking about instruction, learning and assessment, as well as by the pervasive of teachers' beliefs about students' knowledge, by the way in which teachers' thinking was influenced both by their beliefs and by their knowledge and by the interconnections that to exist between knowledge and beliefs in the teacher' mind. (p. 60-61)

In line with these findings, a number of case studies investigated the effect of formal pedagogical knowledge on teachers' beliefs and classroom actions (Grossman, 1990; Grossman & Richert, 1988). Some of these studies affirmed that teacher pedagogical education has little although not insignificant influence on teachers' practices. Richardson (1996) cite for instance an interesting study conducted by Clift (1987). This study examined the difference between pedagogical and non-pedagogical perspectives of English teachers in terms of their pedagogical content knowledge and teaching practices. There were significant differences between English majors who were not interested in teaching and English majors who had completed their student teaching program. The beliefs about teaching and learning of the former group tended to have a more constructive approach to interpreting literature than the latter group who were more authoritarian.

Zeichner and Gore (1990) state that "deeply engrained and partly unconscious feelings and dispositions developed as a pupil, exert a continuing influence on teacher activity" (p. 333-334). They present an overview of various life history methodologies used for capturing the socialising influence of the life experiences or 'architecture of self' (Pinar, 1986) that pre-service teachers bring to teacher education programs and teaching. They conclude that "a variety of biographical, autobiographical and life history methodologies ... have begun to provide us with rich information about the ways in which teachers' perspectives are

rooted in the variety of personal, familial, religious, political and cultural experiences they bring to teaching" (p. 333-334).

Other researchers whose line of thinking has much in common with this framework are Entwistle, Skinner, & Entwistle. They conducted a study (2000) to explore the possible origins of Post Graduate Certificate in Education students' beliefs about teaching. The findings of pre-teachers' perceived influences indicated that personal experiences as opposed to knowledge was much more influential. They also affirm that the course seemed not to change their views about teaching – rather it showed how beliefs could be justified from evidence and put into operation within teaching practices.

Crow (1988), however, argues that the influence of the formal knowledge received in teacher education seems to be latent in the first few months of teaching practice. There is a period of 'lag time' by which cognitive changes that took place during formal training find their way into teaching practices. Featherstone (1993) also suggested that there may be a "sleeper effect" of teacher education. "The voices of teacher educators sometimes echo forward into these first years of teaching; the novice sometimes rehears, with a new ear, propositions which seemed to make little impact on them at the time they were offered" (p. 110).

Nevertheless, studies like that conducted by Levin & Ammon (1992; 1996) are off tune from the harmonious consistency these research studies provide. They conducted a longitudinal research of six years with four teachers based on periodic clinical interviews and classroom observations. The findings indicated that the 'wash out' effect (Zeichner & Tabachnick, 1981) of teacher training suggested by many researchers was not there.

To sum up, studies of the origin of teachers' beliefs indicate that many different life experiences contribute to the formation of strong and enduring beliefs about teaching and learning. These beliefs, from the constructivist perspective, should be surfaced, acknowledged, and addressed during the teacher education program and teacher professional development programs if these programs are to make a difference in the deep structures of knowledge and beliefs. Furthermore, the development of teachers thinking was found as neither smooth nor linear. To conclude, these studies shed light on the complex nature of teachers' beliefs and understandings as they develop and affect action (Levin, 2003; Sugrue, 1997): a complexity that Shulman (1986a) highlights saying:

> I begin with the assumption that there is no "real world" of the classroom, of learning and of teaching. There are many such worlds, perhaps nested within one another, perhaps occupying parallel universes which frequently, albeit unpredictably, intrude on one another. Each of these worlds is occupied by the same people, but in different roles and striving for different purposes simultaneously. (p. 7)

3.3.5 The Nature and Mechanism of Belief Change

A common theme in the literature about teachers' beliefs is that changing them is a inexplicable and complex process. Various attempts in teacher education and teacher professional development proved them to be generally static and enduring, unaltered and resistant to change (Nespor, 1987; Pajares, 1992). Being "wired-in human tendencies" (Bruner, 1996, p. 46) and deeply ingrained beliefs, as Bruner along with Zeichner & Tabachnick (1981) and Kennedy (1997) believe, changing beliefs looks like a daunting task.

Because of the way beliefs are formed, the earlier a belief is incorporated in the belief system, the more difficult it is to alter. These beliefs subsequently affect perception and strongly influence the processing of any new information. Though newly acquired beliefs are most vulnerable, with time and use, they become robust. Individuals hold on to them even if they were based on incomplete, incorrect knowledge, and even if scientifically proven otherwise (Pajares, 1992). The power of beliefs can easily outweigh the clarity and convincing logic of contrary evidences (Munby, 1982). Individuals tend to turn conflicting evidence into evidence that supports their already held beliefs.

In doing so, Nisbet & Ross (1980) and Nespor (1987) explain, it is not only the emotional quality of beliefs but the cognitive and information processing principles employed that are responsible. The effect of beliefs on memory seems to colour the inputs as well as how they are retrieved. Individuals use encoding and decoding biases to filter and selectively retrieve material from memory that ultimately would confirm prior theories (Pajares, 1992). No wonder then that individuals may be engaged in discussions about deeply held beliefs and manage to survive them with their preconceptions intact (Figure 3.2).

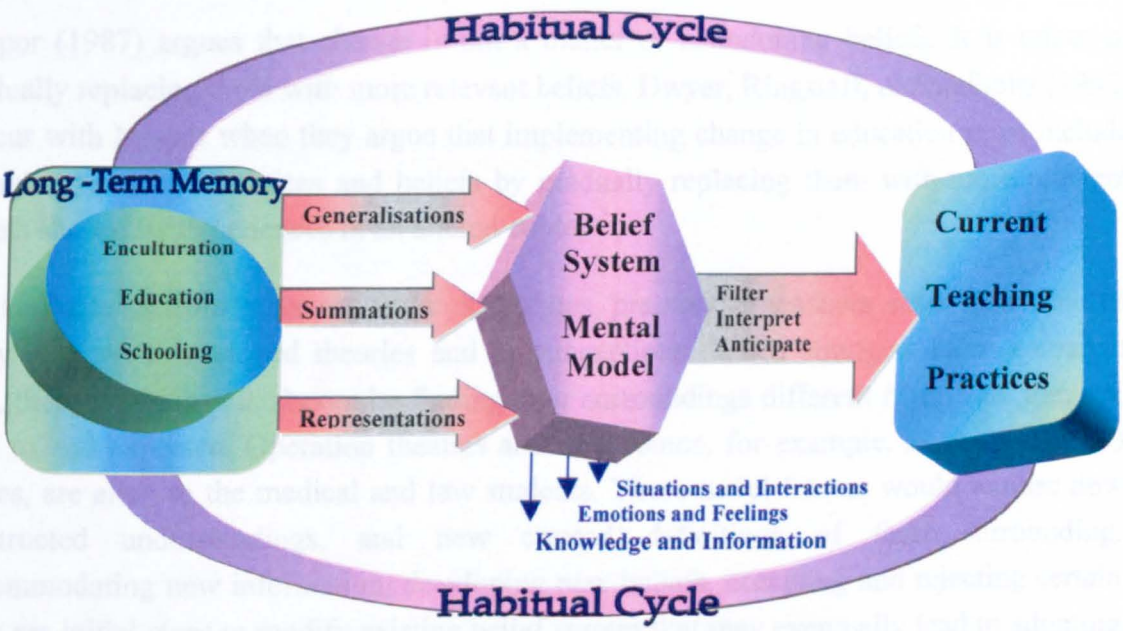


Figure 3.2: Information Processing Model of the Formation of Beliefs

Pajares (1992) sums it up in his insight into how beliefs function and how this functioning contributes to their resistance to change saying:

> On the social and cultural level, [beliefs] provide elements of structure, order, direction, and shared values. From both a personal and socio/cultural perspective, belief systems reduce dissonance and confusion, even when dissonance is logically justified by inconsistent beliefs one holds. This is one reason why they acquire emotional dimension and resist change. People grow comfortable with their beliefs, and those become their "self," so that individuals come to be identified and understood by the very nature of the beliefs, the habits, they own. (p. 318)

Peterman (1991) – based on the conceptualisations of Abelson (1979), Nisbet & Ross (1980), Rokeach (1968) and Sigel (1985) – suggests that, if beliefs are mental representations integrated into existing schemata, three assumptions must follow: beliefs form a schema – like semantic network, contradictory beliefs reside in different domains of that network, and some beliefs may be core and central and therefore difficult to change. Kitchener (1986) similarly describes epistemic belief structure as "a loosely related network of assumptions some of which are more closely associated than are others" (p. 83). Woods (1996) also speculates that when teachers' beliefs are very tightly interconnected with other beliefs, they are more difficult to change. On the other hand, when the belief is less densely connected to other beliefs, change seems less complex. This implies that in order for change to happen, a deconstruction of beliefs is necessary before another set can be constructed. This process can "lead to period of disorientation, frustration, even pain" (p. 293). Furthermore, he states that because each belief is part of an interwoven network which includes many other beliefs, teachers cannot simply at will 'change' one belief by itself. Therefore, teacher change can surely be encouraged but surely not mandated.

Nespor (1987) argues that change is not a matter of abandoning beliefs. It is rather of gradually replacing them with more relevant beliefs. Dwyer, Ringstaff, & Sandholtz (1992) concur with Nespor when they argue that implementing change in education must include changing teachers' practices and beliefs by gradually replacing them with more relevant beliefs shaped by experiences in an altered context.

Unlike students from other academic disciplines, pre-service teachers enter their field of study with well-developed theories and preconceptions. When strangers enter a strange land, their confidence is shaken by finding their surroundings different from what they are used to and expected. Operation theatres and courtrooms, for example, as Schutz (1970) argues, are alien to the medical and law students. These novel frames would require new constructed understandings, and new created definitions of their surrounding. Accommodating new information, developing new beliefs, accepting and rejecting certain ideas are initial steps to modify existing belief system that may eventually lead to adopting new beliefs (Pajares, 1992). It is very likely that such processes would involve minimal conflict or threat as they have slight adherent ties to former expectation, practice and

habits. Pre-service teachers, on the other hand, have familiarity with their classrooms for a great number of years that would make the need for redefining their situations as unnecessary, and potentially threatening (Pajares, 1992). To change beliefs, then, accommodation has to take place. Posner, Strike, Hewson, & Gertzog (1982) suggested that individuals must be dissatisfied with their existing beliefs and that new beliefs must be intelligible and appear plausible before most accommodation can happen.

3.3.6 Research on Pre- and In-Service Teachers' Belief Change

Numerous research endeavours have examined belief changes at the pre-service and in-service levels. These studies can be grouped into two categories (Richardson, 1996): studies that examine belief change as a natural part of the developmental process of teaching experiences and studies that examine change as an outcome of specifically designed intervention programs.

Most of the research on change as a natural part of the developmental process category stems from work on socialisation. The focus of that is mostly on pre-service teachers' transition from teacher education programs to teaching. A number of studies seem to show a trend of change in pre-service teachers' perceptions that is of considerable concern. Pre-service teachers seem to change their views from the constructivist and humanistic (often stressed in teacher education programs) to become more traditional or behaviourist (Carroll, 2005; Hoy, 1967; Hoy & Woolfolk, 1990; John, 1991). Pre-service teachers see their students less as friends and individuals and their role more as the authoritarian. Two rationales are suggested for these findings (Cochran-Smith, 1991; Lortie, 1975; Richardson, 1996). The first relates to the strong effect of the preconceptions and beliefs built up by life and school experiences, discussed earlier. Therefore, there is a concern on the 'little' effect teacher education programs have in addressing such beliefs. The second relates to the conservative influence of schools that seems to counter these initial humanistic tendencies. Findings of a longitudinal study conducted by Bullough, Knowles, & Crow (1992) examining teachers' metaphors also suggest that teachers' personal identities develop and change with teaching experiences.

Some studies have examined the beliefs change of pre-service and in-service teachers as a result of specific teacher education and staff development programs. This research is mostly drawn from interventions attempting to advance reflection and constructivist philosophies (Richardson, 1996). The findings of these studies are inconclusive. Discrepancies in the nature of the programs, methodologies used, and how change is assessed have contributed to this.

A number of studies examined conceptual change and showed evidence of changing beliefs in pre-service teachers. Al-Shibli (2003) explored changes in pre-service science teachers' perceptions of learning by introducing interactive units that aimed through problem solving to engage and challenge beliefs. The findings suggested that a significant change in beliefs took place. Similarly, Hollingsworth (1989) concluded that constructivist

pre-service teacher education programs seemed to affect students' beliefs. Other studies (Al-Weher, 2004; Feiman-Nemser, McDiarmid, Melnick, & Parker, 1989; Huey-Ling & Gorrell, 2002) indicate similar findings. Brownlee (2003) and Brownlee, Purdie, & Boulton-Lewis (2001) conducted a number of studies designing programs with the aim of changing beliefs about knowledge and knowing. The findings suggest that participants who were engaged in the specially designed teaching program experienced more growth in sophisticated epistemological beliefs than participants in other teaching programs.

Korthagen (1988) also found that pre-service teachers who have a reflective orientation tended to do well on his reflective teacher education program. Those who do not have this either dropped out or changed orientations. Yet, this change, warned Korthagen, may be at a surface level; these students may "simulate learning behaviour (*quasi-adaption* to the conceptions of learning of the educators)" (p. 48). Other studies were generally sceptical that change could happen and conditioned its effect based on pre-service teachers' engagement and willingness to confront their beliefs (Hollingsworth, 1989), their dogmatism (Ben-Peretz, 1990), and personality types and thinking styles (Zhang, 2004a, 2004c). Other studies (Ball, 1989; Bolin, 1990; Civil, 1993; Feiman-Nemser & Buchmann, 1989; Simon & Mazza, 1993; Zeichner, Tabachnick, & Densmore, 1987) found that pre-service teachers' beliefs either remained intact throughout their program, or tended to solidify rather than change.

Efforts to change in-service teachers' beliefs show similar patterns of findings. Some programs managed to achieve significant change in beliefs in the desired direction either by focusing on teachers' teaching metaphors (Tobin, 1990), or by reconstructing and reflecting upon teachers' stories of career history, professional self and subjective educational theory (Kelchtermans, 1993) or by fostering a constructivist conception of teaching (Senger, 1992). Other studies indicated that some teachers change while others do not. Studies suggested that teachers of certain personality types (Korthagen & Kessels, 1999; Minewiser, 2001) or with certain thinking styles (Sternberg, 1994) tend to teach in a more constructivist way other than other types. Such findings raise many questions: should individuals of certain personality type be chosen as teachers? What could be expected of teachers with certain personality types that are not in alignment with what change advocates? How can staff development courses be designed to accommodate different teachers' personality types to initiate change? Albeit interesting to reflect on, discussing these issues goes beyond the purpose of this chapter.

To summarize, research on changes in teachers' beliefs suggest that the context of schooling and classroom experiences exert powerful influences on teachers' beliefs and knowledge of teaching. However, it also suggests that enduring structural change must account for the way beliefs are formed and the mechanism of change. Teaching and staff development programs that approach learning to teach from a constructivist perspective are to an extent successful in engaging participants to examine and, possibly, change their beliefs. Pre-service education, nevertheless, is thought of as posing the greatest challenge in changing students' beliefs. Richardson (1996) suggests that this may be due to the lack

of practical knowledge on the students part and the difficulty of tying their beliefs to teaching practices. The beliefs with which they enter classrooms remain untested and students are not aware of them or their role in affecting their practices. Therefore, there is a great scepticism as to the real change pre-service teachers may exhibit. Korthagen (1988) and Shipman (1967a; 1967b) suggest that pre-service teachers are good at figuring out what the teacher educator wants to hear. This urges a review of how teacher education is constructed and the role school experience plays in the transition from university to school.

Richardson (1996) analysed some constructivist staff development programs that were successful in changing teachers' beliefs. Such an analysis yields the following principles:

1. The participating teachers' beliefs and understandings are a major element of the content of the staff development process.

2. The goal of the process is not to introduce a specific method or curriculum to be implemented by the teachers. Instead, the goal is to facilitate conversations that allow the participants to understand their own beliefs and practices, consider alternatives, and experiment with new beliefs and practices.

3. Conversations about beliefs and practices are brought together with considerations of the moral dimensions of teaching and schooling.

4. During the course of the process, the discussions among staff developer and teachers move away from domination by the staff developer towards teacher control of the agenda, process and content.

5. The staff developer is knowledgeable about current research and practice; however, he or she is not seen as the only "expert." A collaborative process is facilitated that allows the teachers to recognise and value their own expertise.

6. The staff development process is long term, and it is expected that teachers change at very different rates.

Smith & Sutherland (2003) suggested a further principle:

7. The creation of a community of teacher-learners to support one another during the course and back in the classroom. Community as such is seen as a catalyst for reinforcing and sustaining change.

Replicating these proposed characteristics of staff development in teacher education programs may promote change in beliefs (Richardson, 1996). Still important issues are worth of discussion: Is change endurable? If change takes place, would it be possible to transfer its effect from one subject or context to another? How change is reflected in practice? The latter two are discussed in the following section.

3.3.7 Beliefs and Classroom Practices

This section discusses the complex relationship between belief and behaviour or, more accurately, beliefs about teaching and instructional practices. Since the early 1970s, research on teacher cognition shifted from the behaviourist stance that sought to describe teachers' behaviours (management, organising activities, making structured assignments, ascribing praise and blame, planning lessons, and judging general student understanding) to cognitive psychological perspectives on teaching and learning (how teachers decide what to teach, where their explanations come from, how teachers choose to represent their teaching, how they question students about it, how they deal with students misunderstandings and misconceptions). This line of research is what Shulman (1986b) calls 'the missing paradigm'. Although the cognitive psychology of learning has focused more recently on such questions, it is invariably from the perspective of the learner, rather than the teacher (Fang, 1996; Shulman, 1986a, 1986b). In the current research, therefore, the focus is on listening to teachers' voices about their teaching orientations, and preferences and why they think they are more inclined to teach in one way rather than another.

There is support from the literature (Calderhead & Robson, 1991; Kagan, 1992; Nespor, 1987; Pajares, 1992; Richardson, 1996; Thompson, 1992) that a better understanding of teachers' beliefs can significantly impact on practice and enhance educational effectiveness. This assertion has been empirically examined by many studies, the findings of which have not been consistent. While some studies identified a congruency between teachers' professed views and their instructional practices, other studies highlighted large discrepancies between teachers' "*espoused theory*" (Caine & Caine, 1997a, 1997c) or beliefs and their observed classroom practices. A review on such studies is available in Fang (1996) and on mathematics in Thompson (1992).

Many explanations, therefore, have been offered as to why such inconsistency of findings emerges. The discrepancies indicate that teachers' conceptions of teaching and learning are not related in a simple cause-and-effect way to their instructional practices. Instead, they suggest a complex relationship with the interplay of many variables.

Of such influences are the complexities of the classroom life that can constrain teachers' abilities to attend to their beliefs and provide instruction that aligns with their theoretical beliefs (Fullan & Hargreaves, 1992; Paris, Wasik, & Turner, 1991; Roehler & Duffy, 1991). Another influence is the social context in which teaching takes place, with all the constraints and opportunities it offers. Embedded in this context are the values, beliefs, expectations of the students, parents, colleague teachers, administration, the adopted curriculum, the assessment practices, the values and philosophy of learning of the educational system and the political climate of the society in general. In this study, such influences are examined in an attempt to investigate, from teachers' perspectives, what helps or impedes them to teach in a way consistent with what they think beneficial for the students.

Ernest (1988) addressed the effect of the social context on teachers' instructional decisions and actions of mathematical teaching saying:

> These sources lead the teacher to internalise a powerful set of constraints affecting the enactment of the models of teaching and learning... The socialization effect of the context is so powerful that despite having differing beliefs... [about the subject and its teaching], teachers in the same school are often observed to adopt similar classroom practices. (p. 4)

Another important element that may have contributed to this discrepancy is the lack of knowledge essential for implementing certain ways of teaching. Teachers may not possess the skills and knowledge necessary to realise their beliefs (Thompson, 1992). These elements suggest that contextual factors can have a powerful impact on teachers' beliefs and, in effect, affect their classroom practices.

Also, methodologies used in measuring teachers' beliefs may account for the inconsistencies found in the literature. The reliance of verbal responses to questions as the only source of data without including classroom observations seems practical; yet problematic. Teachers in expressing some of their beliefs tend to manifest verbal commitments to abstract ideas about teaching more than expressing operative procedural theory of instruction. These responses may reflect what should be done rather than what is actually done in the class. National policies as well as school policies can have influence on teachers' language and verbal expression in regard to teaching and learning or even affect their practices without reflecting their true beliefs (Shaw, 1989). From a methodological point of view, relying on verbal expressions, or classroom observations alone, as evidence of belief seems inappropriate. Scheffler (1965) noted that,

> It seems particularly important to avoid mistaking verbal dispositions for belief. To this end, it is crucial that we recognize not only the ramifications of belief in conduct but also the influence of motivation and social climate on verbal expression. (p. 90)

From this discussion, it is clear that the relationship between teachers' educational beliefs and their practice is not a simple linear one, an assumption that appeared to underlie most investigations. The literature, however, suggest that the relationship is more complex, dialectic in nature. In this respect, Cobb, Wood, & Yackle (1990) noted:

> In our view, arguments about the direction of the assumed causality miss the point; the very nature of the relationship needs to be reconceptualized. Our current work with teachers is based on the alternative assumption that beliefs and practice are dialectically related. (p. 145)

This complex relationship is captured in research on beliefs change discussed earlier. Guskey (1986) found that change can more easily happen when teachers are helped to adopt a new practice and see that it was successful. His conclusion of change in beliefs follows, rather than precedes, change in behaviour was challenged by research findings of

Richardson (1996). She suggests that in the process of change, there is a constant interaction between beliefs and practice, and that professional development may be initiated by a change in either beliefs or practice. It may be that in Guskey's study practice was the catalyst for – using Piaget's term – disequilibrium to happen. Other contextual factors should be taken into account to turn any potentially changing experience from being assimilated, to be accommodated. Follow up discussions, reflection and support can offer some ways to make change not only possible but perhaps more durable.

3.4 Conclusion

Early in this chapter, an attempt has been made to sharpen current understanding of what can be described as the conceptual confusion of what defines beliefs. Personal epistemology is perceived as a unit of what constitutes one's educational beliefs. Educational beliefs are in turn considered a unit of what constitutes one's attitudes towards learning to teach and teaching. The close connection between teachers' beliefs and knowledge has been also discussed.

Research on pre-and in- service teachers' beliefs presents a picture of them entering their classrooms with strong, or perhaps even central, beliefs about teaching and learning. They hold images of teachers, both negative and positive, formed during their experiences as students that seem to influence greatly their practices. The nature of the relationship between beliefs and practices is proved by thoughtful analyses to be dialectic, not a simple cause-and-effect relationship. Research also suggests that belief systems are dynamic, permeable mental structures that are susceptible to change. Difficult as it may be, attempts to change are not impossible. This is certainly true if certain criteria are met. Such intervention attempts have to engage motivation, be challenging, and be structured on the recent knowledge of how beliefs are formed and the mechanisms of their change.

Although empirical investigations have been conducted that links beliefs to practices, it cannot be assumed that all change in beliefs translate into changes in practices, certainly not practices that may be considered meaningful or useful. In fact, a given teachers' belief could support many different practices or no practices at all if the teacher does not know how to develop or endorse a practice that meshes with a new belief (Richardson, Anders, Tidwell, & Lloyd, 1991).

The question then would be what practices or instructional approaches exist in the literature. In other words, what underlying models of instruction are implicit to each set of beliefs? A discussion of these issues is presented in the next chapter where a number of models are proposed. An attempt to make a synthesis of them is also presented.

Chapter Four

Paradigms of Teaching

4.1 Introduction

In whatever way researchers describe the way teachers teach, embedded in their categorisation is the assumption that teachers' teaching is either implicitly or explicitly informed by theories of learning. Indeed research has suggested that teachers generally have little explicit knowledge of theories of learning and teaching. Teachers' teaching theories are, therefore, more likely to be implicit than explicit and acquired unreflectively along with content knowledge during past school experiences and initial teacher education courses.

Most teachers tend to focus on their 'practical theory' or 'craft knowledge' that is the actual experience of teaching, and what it means to be in the classroom, rather than understanding and adopting a particular theoretical perspective. Though they may operate within an epistemological perspective, they are not necessarily able to articulate the reasons behind their preferences as related to certain theory or a particular paradigm (Collinson, 1996). This is what Bruner (1999) calls 'folk psychology'. Teachers' reliance on everyday intuitive theories does not, by itself, negate the validity of their epistemological position. Indeed Perry (1999) believes that structurally different epistemological assumptions imply different forms of teaching and learning. In the same sense as structurally different assumptions about the origins of moral values dictate different forms for the expression of responsibility.

The following section looks into several different instructional approaches or teaching perspectives that has been described in the literature and are congruent with the previously discussed perspectives. The purpose is to determine whether the participants in this study fit into any of the proposed viewpoints.

4.2 Educational Beliefs and Instructional Approaches

4.2.1 Caine and Caine's Instructional Approaches

Caine and Caine, in implementing their *Brain Based Learning* theory, worked with teachers across America to help school systems move from the traditional 'factory' model of education to a 'brain based' model of education. They discovered that "real change is also extremely difficult because it challenges traditional and personal beliefs and asks us to revisit and reinterpret our own experiences and our own sense of self" (Caine & Caine, 1997a, p. 23-24). As they continued their engagement with schools, they increased their emphasis on the importance of understanding beliefs of teaching and learning. They found that there are generally three types of "instructional approaches" that are based on different "perceptual orientations" as the fundamental ways of perceiving the world.

Instructional Approach 1 is based essentially on taken-for-granted beliefs about education illustrated in the three statements.

> "Only experts create knowledge",
>
> "Teachers deliver knowledge in the form of information",
>
> "Children are graded on how much of the information they have stored".
>
> (Caine & Caine, 1997a, p. 258)

Instructional Approach 2 is a transitional position between Instructional Approached 1 and 3 (the features of which will be explained later on). Core to the educational beliefs that shape Instructional Approaches 3 are the beliefs that

> "Dynamic knowledge requires individual meaning making based upon multiple sources of information",
>
> "The role of educators is to facilitate the making of dynamic knowledge",
>
> "Dynamic knowledge is revealed through real world performance".
>
> (Caine & Caine, 1997a, p. 258)

From the observations and interviews, Caine and Caine laid out an analysis of the differences they observed and deduced between the three positions.

One difference is the way in which power is perceived. Perceptual Orientation 1 sees power as coming from an external authority and teachers adhering to this position derive most of their power from the system in which they work. They largely rely on the authority of others and on their position to make learning happen in line with the mandated curriculum, prescribed procedures and the correct answer. In contrast, teachers who adhere to Perceptual Orientation 3 find their power largely in themselves: in their thinking and ideas. They have a belief in their own agency and have an internalised sense of authority. Their strong sense of self-efficacy enables them to exercise personal autonomy. Although both have power, the way this is expressed in the classroom is quite different.

A second difference between teachers holding these perceptual orientations is that those who hold Perceptual Orientation 1 tend to see prescribed texts as the source of subject knowledge, focus on what is planned and prescribed with little tolerance for deviation, accept a fragmented view of curriculum, and separate schooling from life. Those who hold Perceptual Orientation 3 tend to seek what interests the students and relate the curriculum to those interests thus linking schooling with life.

A third distinction between teachers at either end of the perceptual orientation continuum is that Perceptual Orientation 1 teachers take pride in formal knowledge and knowing what students need to know and derive joy from success which is result-based. They base

learning and need to learn on outcomes. They use the comments and opinions of others as the criteria for defining self. Perceptual Orientation 3 teachers, on the other hand, see themselves as constantly learning from and with others. They derive joy in the moment-to-moment process of teaching and learning and view themselves in terms of personal transformation. They reflect on their own actions and self-correct on the basis of these.

A fourth and final distinction made by Caine and Caine (1997c) is the difference in the need for control of the learning process. While teachers of Perceptual Orientation 1 emphasise discipline and the need to tell students what to do, Perceptual Orientation 3 teachers are interested in creating a learning environment that reflects a coherent community with student and teacher sharing responsibilities.

It is very difficult for teachers of Perceptual Orientation 1 to see teaching in terms of Perceptual Orientation 3. Teachers who have moved to Perceptual Orientation 2 can use both Perceptual Orientation 1 and 2, as those who hold Perceptual Orientation 3 can, and do, use all three where appropriate. This involves the developmental hierarchical notion of teaching conceptions described earlier in chapter two. Caine and Caine (1997a) propose that the majority of education restructuring efforts in education are currently related to a shift from Perceptual Orientation 1 to Perceptual Orientation 2.

Instructional Approach 1 is the "stand and deliver' approach. Teachers who use this approach appear to be influenced by their own past experiences that belong to the mechanistic behavioural approach. The focus is on the acquisition of facts and skills, memorisation, and repetition. Lecture and direct questioning are the primary teacher-student interaction, along with strong emphasis on control and discipline.

In Instructional Approach 2, many of the beliefs and practices from Instructional Approach 1 continue, especially the "command-and-control mode" of instruction (1997a, p. 25) but there is more emphasis on meaning, and it is organised around projects and complex materials. The perceptual orientation here is in a transitional phase. The more complex outcome of this type of instruction is technical and scholastic knowledge.

Instructional approach 3 is much more learner centred, "brain-based," with genuine student interest as the focus. "It includes elements of self-organization as students focus individually or gather collectively around critical ideas" (1997a, p. 25). A characteristic of Perceptual Orientation 3 thinkers is the sheer joy of learning. This is truly mind/body learning, in which emotions, the senses, and the body are involved in learning as well as the brain/mind. Caine, Caine, & Crowell (1999) refer to this "Aha!" of insight as involving "felt meaning...a physical recognition that something has been learned" (p. 231). Instructional Approach 3 also involves "deep meaning" which "connects what is learned to why it is important to the learner" (p. 231). This affects motivation at all levels, physical, emotional, intellectual and spiritual.

Caine and Caine (1997c) contend that depending on the Perceptual Orientation from which teachers see the world from either Perceptual Orientation 1, 2 or 3 , they tend to use a "transmission", a "transaction" or a "transformation" style of teaching respectively.

4.2.2 Pratt's Teaching Perspectives

Pratt (1998) developed a model incorporating a complex set of categories that emerged from his research on teachers' perspectives on teaching. He interviewed 253 adult educators from different countries and found that these teachers held five very different perspectives. These perspectives are not presented as a hierarchy but rather as a range of legitimate views of teaching, "subject only to variations in the quality of implementation" (p. xiii). A model examines each perspective in terms of the relationship and the interplay between the teacher, learner, content, context, and ideals. There are overlapping areas between these perspectives as well and some teachers may hold more than just one perspective. Pratt argues that such perspectives are guided by teachers' intentions and beliefs. He asserts that "If we wish to understand and influence people's teaching, we must go beneath the surface to consider the intentions and beliefs related to teaching and learning which inform their assumptions" (p. 11). He also states that "We may not be aware of a perspective because it is usually something we look through, rather than look at, when teaching" (p.33).

The five perspectives proposed by Pratt are:

Transmission – effective delivery of content

Apprenticeship – modelling ways of being

Developmental – cultivating ways of thinking

Nurturing – facilitating self-efficacy

Social reform – seeking a better society (Pratt, 1998, p. xiii)

The transmission method is the most traditional perspective and is steeped in the objectivist view. The belief is that there is a stable body of knowledge that can be transmitted to learners. The teacher and the content are the dominant element and the learner is assumed to be a passive recipient.

The apprenticeship perspective has a long tradition outside of the formal classroom. Pratt (1998) describes this perspective as one in which the teacher, as the embodiment of "the knowledge and values of the community of practice" (p. 43) seeks to acculturate the learners into the community. In this view, teachers and content are interwoven and the context is important as well. Pratt comments that the student is learning to be someone (doctor, plumber, mechanic, etc.) as much as learning to know how to do something.

The developmental perspective is derived from cognitive psychology. In this view, it is assumed that each learner has developed a cognitive map or a mental model that guides his/her interpretation of the world. Learning occurs when a cognitive map is revised or replaced. The teachers' role is to create situations that challenge the learner's cognitive map and work with learners to reconstruct their understanding of something. This is a "learner-centred" philosophy. The teacher's task is to help learners think and problem solve. The content is merely the means through which this is achieved. Pratt (1998) contends that teachers who hold this perspective "try to introduce learners to the essence of their content in ways that engage what they already know and expand their ways of knowing" rather than "working to pass along information or to get information across" (p.47).

Pratt claims that the nurturing perspective has been the most prevalent view of teaching for adult education. Teachers with this perspective hold a belief that the learner's self-concept and feelings of self-efficacy affect their learning most. The dominant elements in this view are the learner, the teacher and the relationship between them. This relationship must be balanced between caring, challenging and helping the learner to become confident, self-sufficient learners. Learners must attribute their success to their own effort and ability, rather than to the teacher's generosity. The content in this viewpoint is the means by which learners achieve certain goals.

For teachers who hold the social reform perspective, ideals form the focal point of their teaching. These ideals are linked to "vision of a better society" (Pratt, 1998, p. 50). The emphasis is on cultural, political or moral imperative. Content and learners are secondary to this agenda.

Although Pratt focused on adult educators, the perspectives can be seen in teachers at other levels as well.

4.2.3 Reinsmith's Archetypes of Teaching

In higher education, Reinsmith (1992) proposed seven archetypal forms of teaching that he placed on a continuum ranging from teacher-centred to learner-centred. He defines teaching as,

> A series of successive embodiments or encounters wherein particular relationships are established between teacher and learner(s). These encounters change and move gradually from peripheral engagement towards educational intimacy until at last the teaching presence comes to reside fully in the learner. Thus, both teacher and pupil are, in a sense, newly created through each stage of the encounter. (p. xvii-xviii)

Reinsmith (1992) proposed that a successful teacher "works within or inhabits a teaching form with all the energies attendant to it" (p. xiv). He, moreover, argues that these archetypal forms can be enduring and there are recognisable patterns to them. "To Whom It May Concern", he explains:

> say that a teacher works within a form is both to preserve the individuality of the teacher (without whom the form would not come into being) and at the same time to see or intuit beyond this to something more archetypal and enduring. (p. xiv)

These seven forms fall under four general teaching modes that Reinsmith refers to as *presentational, initiatory, dialogic* and *elicitive.* He also describes a fifth mode in which there are only learners, which he calls *apophatic*. Most of Reinsmith's archetypes have more than one descriptor. These describe a range even within the archetype. According to him, archetypal forms 1 through 4 are teacher-centred and forms 6 through 9 are learner-centred. These forms are

Presentational Mode:

Form 1: Teacher as Disseminator/Transmitter
Form 2: Teacher as Lecturer/Dramatist

Initiatory Mode:

Form 3: Teacher as Inducer/Persuader
Form 4: Teacher as Inquirer/Catalyst

Dialogic Mode:

Form 5: Teacher as Dialogist

Elicitive Mode:

Form 6: Teacher as Facilitator/Guide
Form 7: Teacher as Witness/Abiding Presence

Apophatic Mode:

Form 8: Teacher as Learner
Form 9: Teacher as Absence of Teacher (Reinsmith, 1992, p.xx)

In the Presentational Mode there is a one-way flow of energy, from teacher to student. This is the lecture method in which facts are disseminated and information is transmitted from teacher to student. Reinsmith (1992) believes that this is still the most common form of teaching in higher education. For teachers who use the Disseminator/Transmitter form the goal is to pass both factual and procedural knowledge through an imitative process. The emphasis is on the content and the message. This form of teaching "implies the memorize-regurgitation model of learning" (p. 4). Teachers of the second form of this mode lecture still, but also attempt to engage with the students. As lecturers, teachers are enthusiastic demonstrating a love for the subject. The Dramatist, although still in the Presentational Mode, "employs a degree of narrative from involving psychodrama and suspense" (p. 14). This teacher is a very engaging lecturer, but there is still basically the one-way flow of energy.

In the Initiatory Mode, there is a relationship based on a bond of trust that is created. The teacher is still the dominant force, but is able actively to engage students in learning. In the Inducer/Persuader form, the teacher becomes an inviting presence. This is often referred to as "motivational or stimulative" (p.27). The teacher must involve the students at both affective and cognitive levels with the goal of helping the student become intrinsically motivated to learn. In this approach learning is an enjoyable activity. A sense of humour and a spirit of fun are important to the teacher. The Inquirer/Catalyst form grows from the Inducer/Persuader form. After trust and self-efficacy have been established, the teaching method is one of questioning and challenging students to grow and learn.

In the Dialogic Mode, both the teacher and the leaner engage in an equal exchange of energy in which the emphasis is on the reciprocal interaction between teacher and learner. Reinsmith (1992) states "The central activity of dialogic teaching is conversation or discourse wherein the interlocutors mediate the world to each other" (p.74). There is a communal sharing, with the understanding that all participants have something to contribute. The contexts that allow this to occur most easily are group discussions, seminars, and private tutorial. Reinsmith notes that this style is not very common due to the reluctance on the part of many students to become involved at this level. It does take time to build a level of confidence and trust.

In the Elicitive Mode teaching becomes more learner-centred. The teacher's task has become that assisting the student to learn. Reinsmith (1992) contends:

> Genuine mid-wifery is the act of helping students articulate what is already within. It is in the elicitive mode that the students' energies are refined. On the one hand, immersion in group work is even more spontaneous and cooperative, on the other, something is being drawn out of the communal which enriches the personal quest. (p. 103)

In the Facilitator/Guide form the teacher acknowledges that learning is directed from within. Reinsmith (1992) notes that "holistic educators have always viewed the teacher's task as that of assisting the inner energies of the child" (p. 105). In this book, Reinsmith focused on teaching in higher education and he comments on how difficult it is in the college classroom to set up this kind of interaction partly because the teacher is still the "final evaluator" of the students' progress and partly because of the resistance immature students often manifest when being encouraged to accept responsibility for learning. In addition, the amount of time this type of teaching takes is often constrained by the typical scheduling of classes. In a class where the teacher is a facilitator of learning the climate is one of trust, respect, openness and authenticity. There are small groups, which work co-operatively to discover rather than to compete. The teacher relinquishes the role of the authority figure, and organises and facilitates learning.

The other form in the Elicitive Mode is teacher as Witness/Abiding Presence. The teacher in this mode of teaching "may have set up the environment and created structures for learning, he or she moves into a totally receptive frame of being" (p. 136). The teacher

models the role of authentic seeker. Reinsmith declares that in this encounter the student's individuality is confirmed. "The teacher lets go as the student totally assumes control of the learning process and begins to internalise the teaching function itself" (p. 157). This most often happens in one-to-one tutorial or independent study.

In Reinsmith's Final mode, the Apophatic, the student assumes full responsibility for his/her own learning, and the teacher sees himself/herself as no longer needed. Reinsmith (1992) acknowledges that change from one form to another is often the result of frustration and dissatisfaction on the part of the teacher and a desire to move to more connection with students. The experience of learning in a different kind of mode can open a teacher to consider new ways of teaching.

4.3 Synthesis

Having explored the different perspectives researches have on how teachers approach teaching, it seems that whether these models have three descriptors five or nine, there appears to be a basic underlying division.

It is a division between a teacher-focused, content oriented approach and student-focused, learning-oriented one, between a mechanistic, objectivist worldview and a subjective, connected worldview, and between a transmittal model of education in which instructors lecture, students take notes, memorise, and reproduce on tests and the constructive model of education in which students are actively involved in processing the information in new and personally meaningful ways. The teacher's role in both is either what King (1993) calls the "Sage on the Stage" or the "Guide on the Side".

In considering those two broad perceptual orientations and instructional approaches, it is important to note that it is not a case of either-or-ness. Caine and Caine (1997c) state that "education has both room and need for all three instructional approaches" (p. 172).

Brain research does not indicate that the first approach is necessarily wrong. It just reveals that this kind of approach is not compatible with how the brain learns best. Brain research provides a foundation for understanding ways to teach that help students learn better and become healthier, happier learners for life (Caine & Caine, 1997b). This is not achieved by the exclusive use of objectivist behaviourist teaching.

Moreover, an education system based on this worldview employs power, which induces downshifting and prevents maximum learning. It restricts one's perspective, reflection, creative thinking, and ability to live with paradox and engage in most forms of higher-order thinking. "When educators downshift learners, they generate 'programming' through data input in much the same way people can program a computer. In general, therefore, the current education system grossly underutilizes the ability of the human brain to learn" (Caine & Caine, 1997c, p. 97).

4.4 Conclusion

The reality of this century, its nature and needs, requires teachers who are perceptually and instructionally grounded in the "wholistic, constructivist, brain-based" paradigm. These teachers have a much richer and more complex repertoire. They can do what other teachers do, but they also go beyond these more common ways of teaching to help students construct "dynamical knowledge" the sort of knowledge that is naturally and spontaneously invoked in authentic interactions in the real world. However, it is apparent that most teaching is still based on the traditional approach. Caine and Caine (1997c) assert that,

> Collectively, society's experiences and beliefs are grounded in Industrial Era approaches to teaching, which does not incorporate advanced research.... The prevalence of this traditional frame of reference suggests that many of the systemic changes beginning to take place may only be cosmetic. (p. 190)

Deep, structural and comprehensive change is required. Change within teachers, specifically, can occur in a multitude of levels: superficial, technical, behavioural and philosophical. It is the latter that should be the focus of higher education institutions in general, and teacher education faculties in particular. This is vital because the quality of the education offered to children is greatly dependant on teachers and how they develop their roles (Forde, McMahon, McPhee, & Patrick, 2006). Such a profound change in epistemology raises a number of questions: what would such a change look like? How does it occur? What can educators do to facilitate it? How can they help students be motivated for it and achieve it? Perry (1970; 1981; 1999) in his theory of ethical and intellectual development has offered answers to these questions. From his empirical investigations with university students, Perry developed a model that conceptualises the process of change and development. The purpose of this research is to build on Perry's interesting work in this area and investigate ways that pre- and in-service teachers perceive to facilitate the possibility of change in thinking about teaching and learning, breaking away from the deeply held and rarely questioned ones. Perry's theory is discussed in the next chapter.

Chapter Five

Models of Students' Cognitive Development

5.1 Introduction

The late 60s of the last century witnessed a growing interest in how university experiences affect students (Jacob, 1957; Sanford, 1962). This stemmed from the controversy over the purpose and nature of university education, an argument that is still very much alive today (Barnes, 2005; Gaita, 2000; Sanford, 1981; White, 1970). The responsibility of higher education and educators is perceived as either a vocational or professional training that is an education for skills and knowledge in some discipline or the provision of university experiences that would facilitate not only the acquisition of sound grounding in a certain discipline's knowledge, but also the development of students' attitudes, values, personality, and the way they make sense of the world. The latter view emphasises that "the overarching purpose of our colleges and universities should be to encourage intentional developmental change throughout the life cycle" (Chickering & associates, 1981, p. 2).

In this context, Perry's scheme of college students' intellectual and ethical development offers a guiding framework against which it is possible to consider and intentionally aim for the development of students as they move through their university program and onward through their careers. This chapter presents a review of the literature related to Perry's scheme of college students' intellectual and ethical development. The review is divided into six parts: The first sketches a broad outline of student developmental theories. The purpose is to locate Perry's theory within this large context of theories. The second draws in more details upon the cognitive developmental theories. The focus is on the underpinning assumptions common amongst such type of theories about how development occurs. Particular attention is devoted to how such assumptions are depicted in Perry's theory. The third part describes Perry's original study, methodologies, results and conclusions. It also discusses critiques of the procedures used and points out their limitations. The fourth discusses clarifications and refinements that have been made to the Perry scheme. In particular, it traces the changes and modifications that have been done to the number of positions. The focus of the discussion is Johnstone's (1998) model which is used in the current study. The fifth part presents a brief discussion of other models, which have reconceptualised and adapted Perry's scheme. The sixth and final part looks at attempts used to assess and measure the development of college students as defined by Perry.

5.2 Student Developmental Theories

Various theories and models have been developed in an attempt to explain the nature and process of students' change during their university years. The conceptualisations in these theories and models have collectively been labelled as theories of 'Student Development'. The focus of these theories is primarily on '*intra*individual' change although '*Inter*individual' and interpersonal experiences are also considered as salient components

of those theories. Student development theories fall mainly into four – broad and sometimes overlapping – categories (Knefelkamp, Widick, & Parker, 1978a; Pascarella & Terenzini, 1991, 2005). Each category shares certain basic assumptions and similar constructs in describing development or pointing to influential factors in development. The four categories are: psychosocial theories, cognitive developmental theories, typology models, and person environment interaction models.

Psychosocial theories' emphasis is on the content of student development (for example, vectors, dimensions, and identity statuses). Erik Erickson (1950) is considered the progenitor of psychosocial theory literature. Chickering's (1969; 1981) seven vectors of student development is, however, the most prominent and influential model for subsequent models and research studies.

The interest of *cognitive developmental* or, as sometimes called, *cognitive-structural* theories is to describe the nature and processes of change. Virtually all theories of this category have their origins in the work of Jean Piaget (1964). These theories concentrate on how individuals construct their epistemological structures to make meaning of their world and lived experiences. Perry's (1999) Scheme of Intellectual and Ethical Development is considered as one of the most influential cognitive structural developmental theories. Kolberg (1958), Gilligan (1981), Kegan (1982), and Loevinger (1976) provided other examples of theories subsumed under this category.

It is worth noting that both the psychosocial and cognitive-structural theories seem to complement each other. "One describes what students will be concerned about and what decisions will be primary; the other suggests how students will think about those issues and what shifts in reasoning will occur" (Knefelkamp, Widick, & Parker, 1978b, p. xii).

Typology models are another distinctive category of student development theories. They emphasise the relatively consistent differences among individuals in the ways they perceive and respond to their world. These styles, preferences or tendencies help in understanding how university experiences affect students differently. Of the most widely known and used type theories are those on learning styles and experiential learning (Kolb, 1976), personality types (Jung, 1923; Myers, 1962), thinking styles (Sternberg, 1997), cognitive styles (Witkin, 1962), multiple intelligences (Gardner, 1983, 1993), and vocational preferences (Holland, 1973).

Theories of person environment interaction, on the other hand, concentrate in more detail on the role the environment plays in influencing the individual's development. Identified within this category are several clusters of theories (Barker, 1968; Clark & Trow, 1966; Lewin, 1936; Moo, 1973; Pervin, 1968; Stern, 1970) that vary in the perception among the theorists of what accounts for 'environment'. They range in their definitions of environment from being objective external reality to being a perceptual one.

As Pascarella & Terenzini (2005) noted, although neither of those categories (typology models and theories of personal environment interaction) attempt to explain the nature or

the process of student's development, they help to "identify some origins of behaviour and provide frameworks for discussing student change and college effects" (p. 46).

It's worth noting that there have been conflicting theoretical claims about the relationship between these developmental domains as there has been limited research investigating the relationship between such developmental constructs. The lack of theoretical concordance over the relationship between, for example, cognitive development – the focus of this research – and development in other domains has created both conceptual and empirical difficulties in identifying analytical strategies to evaluate relationships across domains. The problem has been further complicated by difference in scoring procedures and in type of the data analysed (King, Kitchener, Wood, & Davison, 1989).

Since the beginning of 1980s there has been, nonetheless, an increasing research interest in this particular area with many studies conducted to explore the relationship among these above-mentioned developmental categories (Zhang, 1995). Some of this research has involved the conceptualisations in Perry's theory and some aspects portrayed by other developmental theories.

These studies include: Buczynski's (1991) which studied Perry's theory and theories of development of identity (Chickering, 1969; Marcia, 1966); Hadley & Graham's (1987) which studied Perry's theory and Stern's (1970) perceptions of environmental press; Piper and Rodgers' study (1992) of Perry's theory and the theory of psychological type Jung (1923); and Zhang's study (2004b) of Perry's theory and Sternberg's (1997) theory of mental self-government and Bigg's (1987; 1999) theory of learning approaches.

However, the study of King et al. (1989) stood out. They conducted a longitudinal study to examine the relationship among three developmental domains from the perspective of four theories: moral development (Kohlberg, 1958), ego development (Loevinger, 1976) and intellectual development (Kitchener & King, 1981) and (Terman, 1973). They focused on a series of strategies for analysing the relationships across domains and investigated how these relationships changed over time. Results showed that developmental relationships were not static. They stressed that more theoretical and empirical analyses of the complexity of changes in developmental relationships are needed to untangle these developmental threats.

Most of the research carried out addressed some element of validation of Perry's theory. As almost all suggested significant relationships among the conceptualisations under consideration (see for details Zhang, 1995), these studies helped to provide further evidence on the validity of the Perry scheme. Yet, the paucity of and need for longitudinal studies was quite apparent given the evidence from King et al. (1989) that the relationships across developmental domains change over time.

The next section will discuss more comprehensively cognitive structural theories, which subsumes Perry's Scheme (1970), their underlying assumptions and how they are reflected in Perry's theory.

5.3 Cognitive Development Theories: Between Perry and Piaget

The theories of Perry and Piaget, two of the most influential cognitive developmental theorists, are interrelated. Despite areas of differences, they build on one another, complement, and enrich each other (Fishback, 1997). To understand cognitive development theory, the infrastructure of these web-like connections that exist among these prominent theorists must be examined. Thus, a more comprehensive discussion of the shared conceptions and key assumptions of this category is presented in this section. Great emphasis is placed on their impact on Perry's theory of cognitive development, which is the theory under consideration in the current study.

5.3.1 Structure

Cognitive developmental (also called structural theories) have several concepts in common. They attempt to describe the development of how individuals make sense and create meaning of their experiences. It is the structure of meaning making rather than the content of it that is the concern. Structure is, therefore, a key concept. According to Rodgers (1989), they are "the tacit assumption by which we make meaning of our experiences. They influence how we perceive, and how we evaluate and make decisions on those perceptions" (p. 129). They act as lenses and filters through them people "perceive, organize, and reason their experiences" (p. 121). Structure is also referred to as the "general characteristics of shape, pattern or organization of response rather than a rate or intensity of response or its pairing with particular stimuli" (Kohlberg, 1969 , p. 349).

This is evident in Perry's (1981; 1999) endeavour to map conceptually, through his scheme, the development he empirically observed in his undergraduate sample. The development he traced took place on the *forms* in which a person perceives his world. He believes that, "These 'forms' characterize the structures, which the student explicitly or implicitly impute to the world, especially those structures in which they construe the nature and origin of responsibility" (Perry, 1999, p. 1).

Kohlberg (1969) pointed out that "basic development involves basic transformations of [these] cognitive structure[s].... which must be explained by parameters of organizational wholes or systems of internal relations" (p. 348). In the theoretical framework of Piaget & Inhelder (1969), this is manifested in the concept of 'general heredity' as they postulated two basic tendencies or 'invariant functions' of all species. These are organisation and adaptation. Structure is, therefore, the outcome of the "tendency to systematize or organize their [referring to all species] processes into coherent system" (Ginsburg & Opper, 1988, p. 17).

5.3.2 Assimilation and Accommodation

Having discussed 'structure' as the first of Piaget and Inhelder's 'invariant functions' of organisation, attention now needs to be turned to the second one 'adaptation'.

Adaptation is "... a basic tendency of the organism and consists of two [adaptive] processes of assimilation and accommodation" (Ginsburg & Opper, 1988, p. 18). These adaptive responses are triggered when the individual encounters new information or experiences that challenge the current cognitive structure or schemata. *Assimilation* is the process in which the individual perceptually reinterprets or reorders the challenge to make it consistent with his/her current knowledge, belief, or value structure. *Accommodation* is the process in which the epistemological or belief structures change in order to be consistent with the challenges of the new experience (Pascarella & Terenzini, 2005). Basically, assimilation eliminates conflict and confusion by forcing them to fit into the person's current way of reasoning whereas accommodation resolves conflict and confusion by initiating a process that changes the current way of making meaning to accommodate the challenge (Rodgers, 1989).

Then, it is accommodation – as suggested by Rodgers (1989) – that captures "the process of transition from one stage to a new stage of meaning making" (p. 130). The developmental process is, therefore, perceived as a series of constructions and reconstructions which are "responses to cognitive and affective dissonance [that] lead to reformation of existing structures incorporating old and new knowledge, attitudes, values, and self-concepts in revised, coherent, integrated perceptual structures at a more advanced stage or developmental condition" (Pascarella & Terenzini, 2005, p. 34).

In his theory, Perry (1981; 1999) based his discussion of how individuals generate meaning assumptions on this general principle of adaptation (including assimilation and accommodation). He states that,

> The work of making sense will consist of some balance between two processes: (1) *assimilation* of emerging forms of the experience to the forms of the expectancies the person brought with him (by means of selection, simplification, or distortion), and (2) *accommodation* of the forms of the expectancies and transformations which result in new forms of expectancy. (p. 46)

In Perry's perspective, most assimilation processes are implicit. Accommodation, in contrast, is rather explicit. Individuals become aware of assimilation when it takes the form of sensed realisation, insight or reconstruction that suddenly reveal the meaning of some incongruity of experienced challenge. Such a viewpoint confirms and conforms to the stand cognitive structural theorists have of accommodation as mentioned earlier.

5.3.3 Interaction and Equilibrium

Interaction with the environment and equilibrium are two further core assumptions of cognitive structural theories about how development occurs. The first of these two assumptions, interaction, involves the concept of development as a result of interaction between the structure of the organism and the structure of the environment (Kohlberg, 1969). Rodger (1989) pointed out that two elements are essential for accommodation to

take place; readiness of the organism to receive the challenge and opportunities and the environment offering organisms repeated appropriate challenges.

The influence of environment on the mental structures in cognitive structural theories has been subject to misinterpretation. Piaget's developmental stages have been thought of as merely 'maturational' and not influenced by environment. In the issue of heredity versus environment, cognitive developmental theorists adopt the position of "interactionism" which emphasises the role of both maturation and environment as necessary for development. "... the cognitive-developmental assumption is that basic mental structure is the result of an interaction between certain organismic structuring tendencies and the structure of the outside world, rather than reflecting either one directly" (Kohlberg, 1969, p. 352). This view was revealed more explicitly in Piaget's later writings. They assert the role of environment in creating dissonance or disequilibrium (King, 1978).

The question, then, is what could be 'appropriate' challenges? Why do some environmental events or conflicts facilitate change and others result in assimilation? Blocher (1978) has proposed four conditions that, when met, make accommodation more likely to be facilitated. First, the issues have to be important to the individual, reflecting by that the affective or involvement element of cognitive-structural development (Kohlberg, 1969). Second, the issues should be presented no more one stage above a person's current way of making meaning. If the challenge is two or more stages above the person's level, assimilation is more likely to be the outcome. People seem unable to understand and make meaning of challenges that are more than one stage above their current way of making meaning. Third, other aspects of personality can also affect whether assimilation or accommodation occurs. Finally, issues should be presented in an atmosphere of support and feedback.

Perry, similarly, considers development as coming about through encounters with the world that generate 'cognitive dissonance'. This can be defined as information or ideas that do not fit with one's assumptions about the world (Widick, Knefelkamp, & Parker, 1987). Essential elements of development, from Perry's perspective, are 'interactionism' and 'the tendency for adaptation'. This is clearly demonstrated in his following words,

> The meaning of a given moment in experience emerges from a highly complex and selective interaction of forms derived from two pools: (1) the pool of those forms or orderings a person brings with him to the moment as expectancies; (2) the pool of those forms humanly discernible as 'inherent in the environment' of the experience (physical, social, internal, etc.). The meaning emerging from the interaction will bear varying degrees of congruence and incongruence with the forms of expectancies the person brought with him to the experience. The degree and nature of the incongruence will determine the work a person has to do to 'make sense' of the experience. The work of making sense will consist of some balance between two processes [assimilation and accommodation]. (Perry, 1999, p. 46)

The second assumption is that "the direction of development of cognitive structure is towards greater equilibrium in the organism-environment interaction". It is "this balance in interaction... [that] represents 'truth', 'logic', 'knowledge', or 'adaptation' in their general forms...[it is] reflected in the underlying stability (conversation) of a cognitive act under apparent transformation, with development representing a widened system of transformations maintaining such conversation" (Kohlberg, 1969, p. 348).

5.3.4 Cognitive Stages

The idea of transformations leads to the doctrine notion of a specific 'developmental sequence' with distinct 'cognitive stages'. These cognitive stages have the following general characteristics (Piaget, 1960) as cited in Kohlberg (1969):

- The stages imply distinct and qualitative differences in modes of thinking about the same problem.
- These different modes of thought form an invariant sequence, order, or succession in individual's development. While cultural factors may vary the rate by which different individuals proceed, the sequence does not change.
- Each stage represents a 'structured whole'. Each is representative of an underlying thought-organisation, a form of reasoning that is applied to environmental experiences in general and not to specific content areas.
- Cognitive stages are hierarchical integrations. This means that development of higher cognitive structures involves the integration and incorporation of lower level structures. These lower level structures remain available for use, yet the higher-level structures are utilised for problem solving.

To summarise, development is perceived as a progression along a hierarchical continuum that is additive in nature rather than purely transformational (Colby & Kohlberg, 1987). It consists of a sequence of stages, with each representing a qualitatively different and integrated structural organisation subsuming the previous ones. The highest stage is considered as "an operational definition of human effectiveness in that it spells out the 'most adequate' mode of processing information or of interpreting stimuli" (King, 1978, p.36). Cognitive structural stages are viewed as arising sequentially and always in the same order, regardless of cultural conditions. The age at which each stage occurs and the rate at which the person passes through it are variables. Each stage derives from the previous one, incorporating aspects of it, and is qualitatively different and more complex than earlier stages (Kohlberg, 1969; Pascarella & Terenzini, 1991, 2005; Rodgers, 1989; Wadsworth, 1979).

5.3.5 Irregularities

There are two "striking regularities" that characterise cognitive development stages: being universal and transcultural. However, there are also four major irregularities in development (Ginsburg & Opper, 1988). They are proposed by Piaget (1969) in an attempt to dispel misinterpretations of his theory.

1. The age at which the stages occur vary considerably both within and among cultures.

2. While the course of an individual's development is continuous, a person may exhibit many forms of behaviour intermediary between two adjacent stages.

3. An individual is not always in the same stage of development with regard to different content areas. A phenomenon labelled as 'vertical decalage' – which describe across-stage gap.

4. An individual in a certain advanced stage may not always be able to apply this mode of thinking to wider range of content areas. A phenomenon labelled as 'horizontal decalage' – which describes within-stage gaps.

These irregularities are important considerations in interpreting the data (as will be seen in chapter seven, eight and nine). Of particular significance in the context of this research is that the age at which the stages occur varies considerably within and among cultures. Being a cross-cultural study, the research permitted an investigation into whether or not age variations occurred among the different cultures involved: the Egyptian and the Scottish as opposed to the original American sample from which Perry discerned his scheme. In this scheme, not only does the concept of developmental stages become apparent and pivotal but also its congruence with those proposed by Piaget (1960).

There are other aspects of the similarities between Piaget and Perry: First, by examining the forms of students' assumptions about knowledge and value with which they construe their experiences in different areas of their life at different times, Perry (1999) was able to detect certain forms or structures that are "internally coherent" (p. 52). Second, they seem to have the characteristic of "transcendence over content" (p. xliv). Third, these forms of reasoning appeared across students' four-year reports as "remarkably regular" (p. 53). Finally, these forms depict "a logical order" (p. 3) in which "more complex forms are created by the differentiation and reintegration of earlier, simple forms" (p. 48).

Throughout the "Pilgrim's progress" of students' journey to identity and intellectual maturity, Perry pictures students in motion. He therefore attached great significance to the transition between positions. He believed that this notion of a "student in *transition*" should be emphasised not to imprison them in stages. He concluded that "perhaps development is all transition and 'stages' are only resting points along the way" (Perry,

1981, p. 78). Despite clearly being a stage-model theory, Perry preferred using the term *position* instead of stage because:

1. no assumption is made about duration,

2. to the extent that a student's reports manifest a range of structures at a given time, a position can express the locus of a central tendency or dominance among these structures, and

3. the notion of "position" is happily appropriate to the image of "point of outlook" or "position from which a person views his world. (p. 53)

The progression along the Perry scheme is not entirely linear. Three 'deflections' or temporary suspensions in development movement were identified namely; temporising, escape, and retreat. They will be discussed later.

The above mentioned sequentiality, hierarchical development and structural unity of the Perry scheme has been empirically examined (Kurfiss, 1977). In this study, data was collected from 28 volunteering students at the University of Washington. Data analysis asserted that Perry's positions form a sequence of increasingly complex ideas. However, the construct of 'hierarchical development' was not strongly supported. This finding "highlights Perry's wisdom in adopting the term 'position' specifically to avoid the consistency implied by the term 'stage'" (Kurfiss, 1977, p. 569). As for 'structural unity', data showed that the progression of cognitive development was uneven across different areas. The more actively involved students were with a certain area, the more advanced they became.

So far, this review has highlighted the similarities between Perry and Piaget's conceptualisations of cognitive development – as has been acknowledged by Perry himself (Perry, 1999). Would it be possible then to deduce that both might apparently be using different terms and/or perspectives to describe the operation of the same intellectual and mental structures? This question has been the subject of interest and investigation for some researchers particularly since Piaget claimed that the attainment of 'formal operations' in adolescence marks the end point of development for cognitive structure (Inhelder & Piaget, 1958).

On theoretical grounds, Kitchener & Kitchener (1981) have argued that Piaget's theory did not adequately describe reasoning ability. Broughton (1981) expressed the concern that Piaget's theory does not sufficiently account for crucial elements of development as subjectivity, sociability and historicity that are essential to fully encompass a theory about knowledge and its development. Arlin (1975) and Commons et al. (1989) have also argued that Piaget's theory is incomplete in that it does not embrace advanced stages that are qualitatively different and exist beyond formal reasoning. These forms of thought have been given the generic label *postformal* to distinguish them from characteristically adolescent forms. Such an argument implies a notion of sequentiality between both

theories that means development in a Piagetian sense precedes development as described by Perry.

Empirical studies of Kitchener & King (1981), Perry, et al. (1986) and Lavallee, Beland, Bouchard, & Levesque (1988) have found no significant correlation between the two developmental theories. This means that both are describing aspects of intellectual development that are fundamentally different and independent. This independence suggests that development in either theory does not proceed nor depend on development in the other. It is believed (Perry et al., 1986) that the lack of a strong relationship – sequential or parallel – between both is due to the fact that,

> the two schemes recognize distinctly different kinds of interactions which lead to developmental change. Piagetian development is fostered by the individuals' interactions with physical objects [relatively simple and structured physical problems with clear-cut definite answers]. Perry, on the other hand, describes development as the result of interactions with authority figures and peers [an unstructured problem that requires far more complex reasoning as student's perspectives are the required solution]. (p. 81)

In other words, Piaget describes the developmental ways of doing things. Perhaps, formal reasoning is a description of what might be called *cognitive competency.* Perry, on the other hand, describes the way this competency works out in increasingly mature way (Reid, 2006a). Both theories, however, co-exist and are complementary. They should be considered to nurture growth in all facets of the intellect (Mellon & Sass, 1981).

The following section will look with more details into Perry's scheme, which is the theoretical focus of this study.

5.4 Review of Perry's Scheme

5.4.1 Overview

Perry (1970) sought to trace the path of development from adolescence into adulthood. Through their own accounts, he mapped the journey of college students unfolding views of the world and their thoughts about the nature of knowledge, truth, and values, and the meaning of life and responsibilities. He developed a scheme of intellectual and ethical development. His nine-position scheme (see Table 5.1) can be considered as a relatively enduring outline of the major vicissitudes in human experience through the journey to identity and maturation. The early positions symbolise those simplistic forms in which a person construes his world in "unqualified polar terms of absolute right – wrong, good – bad" (p. 3). Students, then, move from this categorical view of "simple 'either-or ness' of good and bad" (p. 33) to the latter positions that are more complex and sophisticated. Students, here, affirm personal commitments "in a world of contingent knowledge and relative values" (p. 3). The intervening forms and transitions outline the major positions through which they "extend their power to make meaning in successive confrontations with diversity" (p. 3).

A descriptive synopsis of these nine positions and the transitions in between follows (Table 5.1): [from Perry (1981, p. 79) and Perry (1999, p. 10-11)]

Position 1 Basic Dualism	The student sees the world in polar terms of we-right-good vs. others-wrong-bad. Right answers for everything exists in the absolute, known to authority whose role is to mediate (teach) them. Knowledge and goodness are perceived as quantitative accreditations of discrete rightness to be collected by hard work and obedience. (Paradigm: a spelling test).
Students' thoughts	Authorities Know, and if we work hard, read every word, and learn Right answers, all will be well.
Transition	***But what about those Others I hear about? And different opinions? And Uncertainties? Some of our own Authorities disagree with each other or don't seem to know, and some give us problems instead of answers.***
Position 2 Dualism-Multiplicity Pre-legitimate	The student perceives diversity of opinion, and uncertainty and accounts for them as unwarranted confusion in poorly qualified authorities or as mere exercises set by authority "so we can learn to find the answer for ourselves."
Students' thoughts	True Authorities must be Right, others are fraud. We remain Right. Others must be different and wrong. Good Authorities give us problems so we can learn to find the Right Answers by our own independent thought.
Transition	***But even Authorities admit they don't know all the answers yet!***
Position 3 Multiplicity Subordinate	The student accepts diversity and uncertainty as legitimate but still temporary in areas where authority "hasn't found the answer yet." He/she supposes authority grades him/her in these areas on "good expression" but remains puzzled as to standards.
Students' thoughts	Then some uncertainties and different opinions are real and legitimate *temporarily,* even for Authorities. They're working on them to get to the Truth.
Transition	***But they are so many things they don't know the Answers to! And they won't for a long time.***
Position 4a Multiplicity Correlate	(a) The student perceives legitimate uncertainty (and therefore diversity of opinion) to be extensive and raises it to the status of an unstructured epistemological realm of its own in which "anyone has a right to his own opinion", a realm which he sets over against authority's realm where right-wrong still prevails.
Students' thoughts	Where Authorities don't know the Right Answers, everyone has a right to his own opinion; no one is wrong.
Transition (and/or) Transition	***But some of my friends ask me to support my opinions with facts and reasons.***
	Then what right have They to grade us? About what?
Position 4b Relativism Subordinate	(b) the student discovers qualitative contextual relativistic reasoning as a special case of "what they want" within the authority's realm.
Students' thoughts	In certain courses Authorities are not asking for the Right Answer; They want us to *think* about things in a certain way, *supporting* opinion with data. That's what they grade us on.
Transition	***But this 'way' seems to work in most courses, and even outside them.***
Position 5 Contextual Relativism	The student perceives all knowledge and values (including authority's) as contextual and relativistic and subordinates dualistic right-wrong functions to the status of a special case, in context.
Students' thoughts	Then *all* thinking must be like this, even for Them. Everything is relative but not equally valid. You have to understand how each context works. Theories are not Truth but metaphors to interpret data with. You have to think about your thinking.
Transition	***But if everything is relative, am I relative too? How can I know I'm making the Right Choice?***
Position 6 Anticipation of Commitment	The student apprehends the necessity of orienting himself in a relativistic world through some form of personal commitments to simple belief in certainty.
Students' thoughts	I see I'm going to have to make my own decisions in an uncertain world with no one to tell me I'm Right.

Transition	*I'm lost if I don't. When I decide on my own career (or marriage or values) everything will straighten out.*
Position 7 Initial commitment	The student makes an initial commitment in some area.
Students' thoughts	Well, I've made my first commitment!
Transition	*Why didn't that settle everything?*
Position 8 Multiple Commitments	The student experiences the implications of commitment, and explores the subjective and stylistic issues of responsibility.
Students' thoughts	I've made several commitments. I've got to balance them: how many, how deep? How certain, how tentative?
Transition	*Things are getting contradictory. I can't make logical sense out of life's dilemmas.*
Position 9 Resolve	The student experiences the affirmation of identity among multiple responsibilities and realizes commitment as an on going, unfolding activity through which he expresses his life style.
Students' thoughts	This is how life will be. I must be wholehearted while tentative, fight for my values yet respect others, believe my deepest values right yet be ready to learn. I see that I shall be retracing this whole journey over and over- but, I hope, more wisely.

Table 5.1: Scheme of Cognitive and Ethical Development

Perry (1999, p. 10-11) and Perry (1981, p. 79)

The forms of each position include, subtend and transcend coherently the assumptions of the earlier ones but this cannot be said in reverse. This movement is described by Perry as 'development', 'progression', and 'evolution' as distinct from mere generic terms like 'change', 'difference', and 'phases'. As in any sphere of human development, the use of such words suggests that it is better to grow than to detain growth or to regress. Perry himself was aware of the issue that the rating of any person's maturations along the scheme would carry with it a value judgement. He states, "In any exposition of a presumably maturational development in the area of values, language intended to be purely descriptive will become value-laden" (Perry, 1999, p. 50).

He affirms the viewpoint that an "advanced person showing a high rate of growth becomes a 'better' person" (Perry, 1999, p. 50) by offering these justifications : First, because progress in development involves not only 'natural' endowments but also 'personal' attributes such as will, effort, and courage, growth becomes a moral issue. Second, it was evident from students' accounts that the gain of challenging one's assumptions, redefining and extending responsibilities in the midst of increased complexity and uncertainty is less of a self "approval" than of a "satisfying gladness" (p. 51). The discomfort of evading such challenges is less of "social guilt" than of "personal shame". Perry (1999, p. 51) concluded, "The standards, therefore, appeared to have less of the character of an 'introjected' cultural demand and more that of an indigenous 'humanistic conscience', which found certain 'cultural nourishment'. Third, such developmental steps in a person's maturation are considered essential in providing more adequate ways of coping with a changing, relativistic, pluralistic and complex world. Nevertheless, Perry asserts that this value

should be considered as "a normative description rather than an arbitrary prescription" (p. 50).

Kuhn & Weinstock (2002) also emphasise that epistemological theories are 'theories in action' in the sense that individuals in everyday life are required to make knowledge judgements. Understanding whether such judgements are "certain facts, mere opinions, or genuine considered, though fallible, judgements should make an enormous difference in how people make [decisions] and make use of them" (p. 134).

Empirically, Hofer's (2001) comprehensive review offered further evidence that higher levels of epistemological beliefs are related to a wide variety of reasoning skills, argumentation skills (Kuhn, 1991), reflective judgement (Kitchener & King, 1981), moral reasoning (Bendixen et al., 1998), problem solving (Kardash & Scholes, 1996; Schraw, Dunkle, & Bendixen, 1995), reading comprehension (Cunningham & Fitzgerald, 1996; Schommer, 1990), rhetorical maturity in writing (Shapiro, 1984), and deep approach to learning (Zhang, 2004b). Less sophisticated epistemological beliefs, in contrast, exhibited less likeness to engage in skilled reasoning or to change conceptual beliefs (Qian & Alvermann, 1995) and tend to employ a narrower range of thinking skills that are norm-favouring and require simplistic information processing (Zhang, 2004b).

Evolution along the positions of the scheme is not entirely linear. Perry metaphorically describes it as wavelike with three possible alternatives along the way.

1. *Temporising*: Postponement of movement for a while that could be a year or more.
2. *Escape*: Alienation, abandonment of responsibility. Exploitation of Multiplicity and Relativism for avoidance of Commitment.
3. *Retreat:* Avoidance of complexity and ambivalence by regression to Dualism coloured by hatred of otherness (Perry, 1981, p. 80).

He describes it saying that,

> Growth.... occurred in surges. Between the surges, a person might pause to explore the implications of his new position [Temporising]. Or he might lie fallow, waiting for the resurgence of strength to meet the next challenge [Escape]. On occasion he might even detach himself from the whole business, or retreat to old positions, in order to assure himself that he was still his own man [Retreat]. Then, after having found that he was still free to choose, he could know any reengagements to be an authentic act, not an enslavement. Every such moment between surges, we acknowledged, involves risk, subjective and objective. The forces of growth may indeed be forever denied. It happens. (Perry, 1999, p. 198)

5.4.2 Perry's Original Study

In 1968, Perry and his research team made their first attempt at validating the Perry scheme. The study was conducted at Harvard College. The data for the validation study involved transcribed annual interviews with longitudinal samples of Harvard students in the late 1950s and early 1960s.

5.4.2.1 Methodologies

This section presents a brief description of the methodologies Perry and his associates (1970) employed in their attempts to validate the scheme. It includes a brief account of the instrumentation, sampling, interviewing procedures, and rating of the interviews as were involved in the original study.

Instrumentation

In 1953, Perry and his research team devised a measure called *a Checklist of Educational Views* (CLEV). Based on their scores on this measure, students were identified along the desired dimensions and from this were selected for subsequent scheme validating interviews. The CLEV measure is composed of 46 short statements related to educational topics that were rated by the students on a six-point Likert scale.

Sampling

Two samples at two different times with three different classes were used as subjects for the original study. The first sample (1958) consisted of 31 students (27 from Harvard, 4 from Radcliffe). Those 31 were volunteers from 55 students who were sent invitations. The 55 students invited were selected on the basis of their scores on the CLEV and mainly represented extreme types of thinking (dualistic and contingent) in their response to the pluralistic diversity of university life. The second sample was enlarged and randomly selected. It consisted of two cohorts: 30 students (1962) and 79 students (1963). Across the two cohorts 85 students came from Harvard and 24 from Radcliffe. 464 interviews and 84 complete four-year sequenced records were collated. For the final data analysis, 20 of those 84 were randomly selected for the validating procedures.

Interview Procedures

Perry wanted the students to think. To achieve this end, he used interviews in a form of open-ended questions about their experiences of college life rather than using any 'objective short-cut' tool. The main reason was to make sure not to impose or dictate the structure of a student's thought by the structure of the way the questions are put. The danger of using this procedure, of course, is the variety in the form and content of student's reports that would exclude any possibility of orderly structure. Despite this he and his team were able to detect a common sequence of challenges to which each student responded in his individual way.

Rating of the Interview

In 1963, a panel of six judges were independently presented with a sample of students' reports, along with the Chart of Development, a manual and one-hour follow up discussion with the team. Their mission was to identify – using a pre-determining scoring rule – the dominating form of the students' structuring of the world evident in each report and upon that decide where the student could best be positioned along the scheme.

The validity of the "existence" (Perry, 1999, p. 12) of the scheme in students' accounts was measured by the extent to which the judges agreed on their "ratings" of the students' reports to be beyond the level of chance.

For the purpose of objectivity and fearing the interference of the judges' prior knowledge of the students' college year and of the scheme, Perry and his team assigned different tasks for further assurance and validation of the scheme. The rating task, therefore, was accomplished by four sub-tasks:

1) Rating of four years protocols.
2) Rating of single interviews.
3) Rating of experts.
4) And rating of four-year condensed reports. See (Perry, 1970, p. 13-15) for more details.

Perry considered the construct validity of the scheme through the "feeling of recognition and plausibility" (p. xliv) attached to it. He proclaimed, "To whatever generation the reader feels he belongs, he will surely find that the students' experience we portray echoes his own life... The scheme itself may carry its own plausibility. Indeed, its essentials may on occasion seem to reveal only the inevitability of the obvious, in the sense of 'how could life be otherwise'" (p. xliv).

5.4.2.2 Results

As a starting point for the study, Perry and his team assumed that the scheme of development had no validity at all. Their null hypothesis was "the judges will agree in matching interviews with Positions on the Chart at the level of agreement **not** exceeding that attributed to chance" (p. 13).

To test this hypothesis, the analysis was performed on the 6 judges' ratings of the four-year protocols of 20 students for each of their four undergraduate years. As a result, there were a total of 24 ratings for each student. The mean reliability of the mean rating across the six judges for individual interviews for each student of the four years was found to be respectively, 0.966, 0.875, 0.872, and 0.916. The probability of these levels of agreement occurring by chance is less that 0.0005 for the lowest.

5.4.2.3 Conclusions

Based on these findings, the previously set null hypothesis was rejected. Perry, therefore, concluded, "Within its own strictest limits the study demonstrates the possibility of assessing, in developmental terms, abstract structural aspects of knowing and valuing in intelligent late-adolescents. Substantively the study confirms the validity of one scheme of such development, showing it to be reliably evident as a theme common to all students' reports sampled" (p. 16).

5.4.2.4 Critique

The previously mentioned limiting factors of this experimental validation are spelled out from Perry's perspective in the following three points:

1. The subjects were student volunteers in a single college during the year 1954 to 1963.

2. The investigators abstracted the developmental scheme from oral reports given by the students during annual interviews with the investigators themselves.

3. In testing the validity of the scheme the judges performed operations in relation to the data from which the scheme was derived.

Methodologies used to ascertain the measures of human development are commonly regarded as problematic (Bowen, 1977) and have a chequered history (Reid, 2006b). Yet, Perry was aware of that and stressed that they "require the check of explicit limit and the balance of general scepticism" (p. xliv). The literature is, nonetheless, replete with examples of inappropriate analysis (Reid, 2006b). These critical perspectives on the methodologies used for measuring development informed the data analysis of this research and are more comprehensively discussed later on.

There are several limitations in the Perry study, which are important to consider. In his study, Perry (1970) found that the subjects varied developmentally across various content areas. He chose, nevertheless, to report each individual's rating in terms of a "central tendency or dominance" among the rating of these areas. It is important to note that the use of any measure of central tendency masks important and rich individual variance (King, 1977; Parker, 1984; Reid, 2006b).

1. By using consecutively or successively numbered position ratings (i.e. 1, 2, ...9), the qualities of an interval scale are imposed upon cognitive development. There is no evidence to suggest, for example, that the movement from position 1 to position 2 represents the same amount of development as moving from position 2 to position 3 (King, 1977; Parker, 1984; Reid, 2006b).

2. Repeatedly Perry refers to the use of inter-judge reliability coefficients as the basis for validating the scheme. Although validity and reliability are related, each does

not provide a direct test of the other. The reliability coefficients described by Perry are best used to describe the consistency of his assessment technique. Conclusions as to the validity of the scheme (i.e. whether it really describes cognitive development) should be the query of other studies that address the scheme's conceptual character, its relationship to other theories pertaining to cognitive development, and its ability to predict developmental outcomes (King, 1977; Parker, 1984).

3. The basic method of conducting interviews with students used in theory building allowed for a comprehensive view of the student over time. It raised, however, the need for a more heuristic method with less time and effort, but still to be considered valid and reliable assessment tools of students' characteristics (Al-Shibli, 2003; Knefelkamp, 1999; Zhang, 1995).

4. The conclusions were based on a relatively small sample of 20 subjects. In addition, factors such as more men than women in the sample – only two women were included in the judges' final rating sample (Perry, 1999, p. 17), socioeconomic class, the sociological characteristics of the era, the educational background, age and ethnicity make it not generalisable to other contexts (King, 1977; Knefelkamp, 1999; Parker, 1984).

5. Scores from the CLEV were used to select subjects from the class of 1958, but not from the classes of 1962 or 1963. This difference in sampling procedures may partially explain the occurrence of a significantly higher Perry position score for the freshmen from class of 1963 than for the class of 1958 (King, 1977; Parker, 1984).

This particular concern about sample size and balance initiated a number of studies aimed at validating the efficacy of the scheme. There have been several studies that extended the range of college students across different, mostly western, cultures. Nonetheless, there has been paucity in the literature as to studies conducted in non-western cultures. Of those very few is (Zhang, 1999) representing the Chinese context, (Al-Shibli, 2003) representing the Omani culture and (Selepeng, 2000) representing Southern Africa. Taylor's (1990) study involved participants of different ethnic groups. There have been studies that extended the age groups considered. Clinchy, Lief, & Young (1977) and Al-Shibli (2003) included, for example, high school students. Fishback's study (1997) included adult learners as its subjects while Piper & Rodgers (1992) dealt with various practitioners. Some studies sought to investigate further gender differences (Belenky et al., 1986). It's worth noting that in Perry's original study, judges concluded that differences in gender were evident in the content and manner of students' reports rather than in their structuring of experiences. The current research study is another addition to this line of research as it – in part dealt with different cultural contexts (Egypt and Scotland) as well as different age groups (teachers) and predominantly (female) university students.

Being in nature a Western model, it is important to pay attention to what (Knefelkamp, 1999) called "culture cue" in interpreting the data. The use of phrases that reflect cultural perspective of respect and adherence to the authority figures are particular to students from eastern cultures. Though students may seem more into dualism or early multiplicity, their way of thinking may well be consistent with contextual relativism.

Because the relationship between developmental domains have many conflicting theoretical claims (King et al., 1989), some argued that moral development should be a distinct aspect of intellectual development and not simply the application of more complex cognitive structures to moral content (Rest, 1975). Conceptually, therefore, the internal structure of Perry's theory was criticised. Many researchers (Baxter Magolda & Porterfield, 1988; Brooks, 1998; King, 1978; Moore & Hunter, 1993; Rodgers, 1980) suggested that Perry did not identify a unified theory of intellectual and ethical development, but confounded, without explicit clarification, cognitive-structural development and psychosocial development. In his proposed nine-position scheme, the first five are perceived to be more cognitive-structural and the last four as more psychosocial. The scheme is presented as a continuum from cognitive development to moral development (Broughton, 1975; King, 1982; Knefelkamp, 1999; Rodgers, 1980, 1989). Moreover, in this shift, Perry's description of students' commitments is criticised for being an underdeveloped part of the theory (Love & Guthrie, 1999a; West, 2004).

Nonetheless, recently research has begun to argue that both cognitive and affective dimensions are together integrated parts of development (Goleman, 1996, 2004; King & Baxter Magolda, 1996). Perry himself considered this shift as adding an advanced "period of responsibility" to those of Piaget's (Perry, 1999 , p. 230). He believes:

> At this level, therefore, our study addresses issues which psychological science had not yet succeeded in differentiating conceptually, much less in documenting experimentally. Here, ...the study extends its embrace to its subjects' styles of humanistic and philosophical concern. (p. 230)

Widick (1977) stated that "the journey along the nine positions seems to be a perfect operational definition of the examined life" (p. 36). What the last positions involve is a description of personal commitments as distinguished from "habitual never-questioned commitments" (p. 34). Such stages, however, were not given the due consideration or examination by scholars in this area.

This conceptual base built upon the integration of the two developmental constructs; the cognitive and the moral in Perry's scheme is believed to have the credit for inducing provocative and informative scholarly dialogue along with further research studies (Knefelkamp, 1999; Zhang, 1995).

Perry's theory is particularly powerful for its conceptual richness. The scheme has been dynamic, not static (Moore, 2002). Empirically, it has been recognised as a useful tool for instructors both in understanding students' needs and in designing programs to promote

cognitive development (Selepeng, 2000). It is helpful in three major aspects: establishing program goals, planning steps in implementing the program and in evaluating the effectiveness of the program (King, 1978). Theoretically, since the original publication of Perry's study, there has been an evolution in perspectives related to the model in two broad areas:

- Clarifications or refinements within the original theoretical framework.
- Conceptualisation and adaptations of the original work.

The following two sections will discuss these two topics in more details.

5.4.3 Clarifications and Refinements of the Perry Scheme

The scheme was subject to some modifications; three of which will be discussed here with particular emphasis on the third.

5.4.3.1 The Use of the Term 'Relativism'

Though Perry was clear that there is a crucial distinction between position 4 and 5 (late multiplicity and relativism), over the years these positions created considerable confusion as pointed out by (Knefelkamp, 1999; Perry, 1981). Perry's use of the 'relativism' has caused criticism of the scheme as endorsing the kind of relativism that Bloom (1987) and others have many reservations against. For the sake of clarification, Perry ended up using the phrase 'contextual relativism' when referring to Position 5. The thinking defining this position appreciates and allows for the necessity of judgement that is based on evidence; a basic quality the former position does not possess.

5.4.3.2 Direction and Shape of Development

The original depiction of the scheme was based upon the concept of development as linear and hierarchical. Further work with the scheme came to modify this view (Perry, 1981, p. 97),

> Perhaps the best model for growth is neither the straight line nor the circle, but a helix, perhaps with an expanding radius to show that when we face the 'same' old issues we do so from a different and broader perspective.

The view of what Perry considered as 'deflection' had been modified as well (Moore, 2002). Considering Piaget's concepts of *vertical* and *horizontal decalage* (increased complexity of structure and the use of those structures in different aspects of one's life), what may have seemed a delay or 'temporising' was actually a reflection of "horizontal decalogue" (Knefelkamp, 1999).

Additional modification from the research with the scheme revealed that there are at least, three distinct but related uses of the Scheme as metaphors (Knefelkamp & Cornfeld, 1979): "General Perry" – that general overview of the original perspective; "Contextual Perry" –

the varying way of thinking associated with a particular context such as an academic discipline, a religious belief system, or a specific course; and "Functional Regression" – depicting the phenomenon seen when adult learners "functionally" regress to earlier perspectives when facing new learning in a new learning environment.

5.4.3.3 *Modification of the Number of Positions in Perry's Scheme*

As outlined earlier in Table 5.1, Perry's scheme consisted of nine positions with position 4 split into two possible sub positions.

There have been many attempts to simplify Perry's nine positions into manageable categories. Finster (1989) and King (1978) most notably grouped them into four main categories with each category grouping some of the original positions that seem to have many similarities. These four categories are Dualism, Multiplicity, Relativism, and Commitment in relativism (Table 5.2). This modification is commonly adopted in many research studies (King, 2003; Pascarella & Terenzini, 2005).

1 **Dualism** (position 1 and 2). The student believes that right answers exist to all questions and that authorities have these answers. The world is viewed in absolute, right-wrong terms. In position 2 some uncertainty is recognized, but it is viewed as a challenge set by authorities for students to learn to find the answers on their own.

2 **Multiplicity** (position 3 and 4). Uncertainty is now viewed as temporary in areas in which authorities have yet to find the answers. In position 4, uncertainty is seen as so extensive that all opinions are equally valid, and students begin to rely less on authorities.

3 **Relativism** (position 5 and 6). A major shift in thinking occurs at position 5 as the student comes to view knowledge as contextual and relative and is able to make judgements based on evidence and the merits of an argument.

4 **Commitment in Relativism** (positions 7 to 9). Students test out and evaluate various commitments leading to the development of a personalized set of values, lifestyle, and identity.

Table 5.2: Perry's Scheme in Four Categories

(Evans, 1996; Sanford, 1962)

Perry and his team (Perry, 1999) observed that college students are usually somewhere between position 2 and 5. As it is infrequent to find college students either in the very early positions of dualism or the very late ones of commitment, Johnstone's (1998) attempt at modifying the categories was to group the latter two into one. He named these three groups as Perry A, B, and C sequentially representing Dualism, Multiplicity and Relativism. This is illustrated in the following table (Table 5.3).

Category		Dualism	Multiplicity	Relativism	Commitment in Relativism
Position	A	1 & 2			
	B		3 & 4		
	C			5 & 6	7, 8 & 9

Table 5.3: Johnstone's Adaptation of the Perry Scheme

This three-category-scheme was mentioned in Perry's (1999, p. 1-2) first 'caricature' attempt to communicate and illustrate his scheme. It made the scheme more economical and concise, and provided shared simple language that can be used to understand the perspectives from which students think about their learning. Therefore, it seemed rather appropriate to use this three-category scheme for the purpose of this study.

In his adaptation, Johnstone's (1998, p. 8) interest was mainly on four aspects or 'dimensions' of the students' learning: the view of knowledge; the learner's role; the teacher's role and the view of exams (Table 5.4).

	Student A	Student B	Student C
Student's Role	Passive receiver. Acceptor of what the teachers say.	Realizes that some responsibility rests with the student. But what? And how?	See student as source of knowledge or is confident of finding it. Debater. Making own decisions.
Teacher's Role	Authority giving of facts and know-how.	Authority. Where there are controversies, wants guidance as to which the lecturer favours.	Authority among authorities. Values views of peers. Teacher as facilitator.
View of Knowledge	Factual; black and white. Clear objectives ; non-controversial ; Exceptions unwelcome.	Admits 'black-and-white' approach not always appropriate. Feels insecure in the uncertainties this creates.	Wants to explore context. Seeks interconnections. Enjoys creativity and scholarly work.
View of Exams	Regurgitation of 'facts'. Exams are objective. Hard work will be rewarded.	Quantity is more important than quality. Wants to demonstrate maximum knowledge.	Quality is more important than quantity. Wants room to express own ideas and views.

Table 5.4: Johnstone's Simplification of Perry's Scheme

(Johnstone, 1998)

5.4.4 Conceptualisations and Adaptations of the Scheme

The publication of Perry's book and model (1970) has been the impetus to a considerable amount of work exploring similar or related issues. Three particular efforts are worthy of special note, as they reflect the most direct ties to Perry's original conceptual framework and represent the most explicit extensions to the Perry model, though not necessarily developed to be refinements of it. This section of the review will touch upon these subsequent theoretical refinements of the scheme by Belenky et al. (1986); Baxter Magolda (1992) and King & Kitchener (1994).

5.4.4.1 'Women's Way of Knowing'

'Women's way of knowing' is based on Perry's work and involves exclusively the perspectives of women from a wide range of backgrounds. Through in-depth interviews conducted with 135 women, it aimed to explore women's approaches to meaning making

in college and other settings. The interviews covered various topics that covered self-concept, moral judgement, relationships and educational experiences as well as one ultimately labelled 'ways of knowing'. The authors discovered that "women's epistemological assumptions were central to their perceptions of themselves and their worlds" (1986, p. xviii). Five perspectives "from which women view the world, truth, knowledge and authority" and their conceptions of themselves as knowers (Clinchy, 2002, p. 64) were identified and summarised (Goldberger, Tarule, Clinchy, & Belenky, 1996) as (a) silence, (b) received knowledge, (c) subjective knowledge, (d) procedural knowledge, and (e) constructed knowledge.

Although Belenky et al. (1986) claim that the model does not represent a sequential and hierarchical series of stages, Baxter Magolda (1988) has suggested that the categories appear to increase in complexity when viewed in sequence. Moreover, the categories of the Belenky et al. model seem to share both cognitive structures and related assumptions about knowledge with parallel to the positions of Perry's scheme (Baxter Magolda, 1990; Rodgers, 1990). However, differences do exist, particularly in the ways in which women view themselves and authorities (Rodgers, 1990). These differences have been identified as behavioural correlates or stylistic differences, but nevertheless are important because of their implications for teaching and intervention programs. Therefore, Perry and Belenky et al. seem to describe two different styles of knowing within one epistemological structure (Rodgers, 1990). More specifically, women seem not as confident in their abilities in early stages and exhibit more attachment to others in their perspectives of knowledge and learning (Baxter Magolda, 1989).

5.4.4.2 'The Epistemological Reflection Model'

Baxter Magolda's (1992) 'The Epistemological Reflection Model' was also influenced by Perry (1970), Belenky et al. (1986) and King and Kitchener (1994). The model developed was discerned from the results Baxter Magolda reported on a longitudinal study conducted on a cohort of 101 randomly selected college students with women and men equally represented. She identified four "qualitatively different ways of knowing, each characterized by a core set of epistemic assumptions" (Baxter Magolda, 1992, p. 29): (a) Absolute Knowing, characterised by a view of knowledge as certain; (b) Transitional Knowing, characterised by a growing awareness of uncertainty in some areas of knowledge; and (c) Independent Knowing, characterised by the belief that most knowledge is uncertain. Although the fourth way of knowing, Contextual Knowing, was not observed in many college students, it was borne out by subsequent studies with graduates and post graduate students (Baxter Magolda, 1995). Contextual Knowing is characterised by the creation of knowledge through judgments about evidence in a given context. These assumptions are associated with different perceptions and expectations of the learner, his or her peers and instructors about how learning should be evaluated and how decisions should be made.

In addition to these structural differences, she observed that there are more similarities than differences in men and women's way of knowing. These gender-related 'patterns' in reasoning are "used more often by one gender than other but not exclusively by either" (1992, p. 81-82). These identified gender-related patterns of reasoning are perhaps the most significant element of the model. The patterns, called impersonal and relational, represent parallel modes of knowing and reasoning that evolve within the same sets of epistemological assumptions, that is, sequence of development. The impersonal pattern is most often exhibited by men and is marked by separation and abstraction; the relational pattern is more often found in women and is characterised by attachment and connection to others. The two patterns, however, seem to converge at the fourth epistemological level.

5.4.4.3 'The Reflective Judgement Model' (RJ)

The Reflective Judgement Model is a developmental model developed by King and Kitchener (1994; 2002) as a result of over 20 years of extensively gathered empirical evidence from longitudinal and cross sectional studies. Based on Dewey's work on reflective thinking (Dewey, 1933), this model describes a developmental progression in people's epistemic assumptions about knowledge and how these assumptions are related to how people justify their beliefs when faced with ill-structured problems. Although the Reflective Judgment (RJ) Model is not based only on Perry's scheme, several authors have suggested that the two theories appear relatively similar (Baxter Magolda, 1990; Baxter Magolda & Porterfield, 1988; Rodgers, 1989). Despite the differences, the similarities between RJ and the Perry Scheme argue for its inclusion here.

The RJ model is based on the assumption that "[M]aking interpretive judgment about ill-structured problems involves constructing beliefs, a task that requires people to wrestle with questions about the limits, certainty and criteria for knowing, factors that comprise 'epistemic cognition'" (King & Kitchener, 2002, p. 38). Such epistemic assumptions are part of an underlying developmental structure that proved to be tied to the ability to understand the nature of ill-structured problems and to construct solutions for them.

This model proceeds through seven stages each with a distinctive set of assumptions about knowledge, how is it acquired and accompanied by a cluster of stage-related, problem solving strategies. King and Kitchener (1994) clustered their seven stages into three categories: Pre reflective thinking (stages 1-3), Quasi reflective thinking (stage 4-5) and Reflective thinking (stages 6-7).

As revealed in this model, respondents' ways of defending their viewpoints about controversial issues reflect their thoughts about knowledge. It progresses from being concrete, absolute, belonging to authorities who are perceived to know 'the truth' with unexamined beliefs that require no justifications (category 1), to being contextual where others' views and the individual's conclusions are equally legitimate yet reasoned conclusions based on evidence remain elusive (category 2). At the highest stages of the model, knowledge is perceived as neither 'given' nor 'found' but constructed as the

outcome of inquiry, synthesis of evidence and opinion, evaluation of evidence and arguments, and recognition that some judgements are more solidly grounded and defensible than others. Beliefs – in these stages – are judged with respect to their reasonableness, consistency with the evidence, plausibility of the argument, and probability in light of the assembled information. These judgements are to be reviewed, altered on the basis of new information, perspectives or tools for inquiry (category 3) (King & Kitchener, 2002; Pascarella & Terenzini, 2005).

5.4.4.4 Critique

These theories taken together provide more insight into our understanding of students' cognitive development than any single theory in its own. Knefelkamp (1999) asserts Perry's awareness of this as she states that in his interview with students, Perry heard in their thinking more complexity than any model or theory could encapsulate. He emphasised the need for multiple models – or at least three theories – of student development to be used in conjunction with one another to give a fuller insight. This argument would be obvious considering how each theory tackled student development from different yet complementary perspective.

First, the work of Perry and Baxter Magolda is based on longitudinal study; Belenky, Clinchy, Goldberger, & Tarule work is cross-sectional; King & Kitchener's theory is based on both cross-sectional and longitudinal studies.

Second, the form of inquires these theories built upon, taken together, provide a complementary research base. Whereas Perry, Baxter Magolda and Belenky, Clinchsy, Goldberger, & Tarule used more a qualitative approach, King & Kitchener's approach was more quantitative with their structured interviewing techniques.

Third, two of the theories (Perry and Baxter Magolda) focused primarily on the development of college students whereas the others (Belenky, Clinchy, Goldberger, & Tarule and King & Kitchener) situated development during college within the life span by studying adults of various ages from both within and outside higher education.

Fourth, altogether these theories address the issue of gender in their studies. As Hofer & Pintrich (1997) pointed out, Perry's study is considered a pioneering study of men only; Belenky, Clinchy, Goldberger, & Tarule provide a comparable study on women; Baxter Magolda discussed gender-related patterns in her study that included both men and women; and King and Kitchener's theory was built on participants from both genders (Love & Guthrie, 1999a).

Conceptually, all of these theories attempt to explain the mechanisms of development from the perspectives of an interactionist, constructivist, and cognitive developmental view of the individual's evolving understanding of the world. All of these models share the common view of the individual moving through some specified hierarchical sequence in their ideas about knowledge and knowing. As Hofer (2001) noticed "although none of

those who have proposed such models would claim that these are 'pure' developmental models with hierarchically integrated stages and invariant sequences – and several have been careful to provide disclaimers to this effect – these models carry other developmental assumptions" (p. 356).

Moreover, regardless of the number of positions, stages, or levels proposed, each contained three main distinctive categories of epistemological views (see Appendix 5.1 for a visual representation). Elsewhere they were given also different names like: absolutist, multiplist, or evaluativist (Kuhn, 1991), unequivocal knowing, radical subjectivity, and generative knowing (Love & Guthrie, 1999a) and dualism, multiplicity and relativism (Johnstone, 1998).

In addition to these points of intersection and commonalities, there also exist points of differences or rather distinct emphases. Love & Guthrie (1999b) pointed out that these models diverge when they explore and explain the different forms of knowing and when they attempt to make sense of the 'last phase' of development. Perry (1970) emphasises the relative nature of knowledge and ventures into ethical and identity development in commitment in relativism. King & Kitchener (1994) focus on the use of critical inquiry and probabilistic justification to guide knowledge construction. Belenky, Clinchy, Goldberger, & Tarule (1986) describe an integration of subjective and objective strategies for knowing; and Baxter Magolda (1992) focuses as well on the merging of gender-related reasoning patterns to produce a knower capable of constructing knowledge by judging evidence in context. What they have in common at this point is "a conception of the knower coming into a sense of agency in the knowing process" (Love & Guthrie, 1999a, p. 80). This implies the realisation of the active role the learner has in constructing an individual perspective on issues by considering context, comparing and evaluating viewpoints. Most important is the capability to think meta-cognitively, that is, the power to generate, produce, originate, author their own truth and reconsider these 'truths' as new experiences or evidences come into perception (Love & Guthrie, 1999a).

5.4.4.5 Synthesis

Finally, it's worth noting that there have been other efforts aimed at reconciling and synthesising these theories into one. The model presented by West (1996; 2004) did just that. By investigating the nature of development in the models of Belenky et al. (1986), Baxter Magolda (1992), King and Kitchener (1994) and Perry (1970), West (1996; 2004) concluded that the characteristics of the developmental stages of these models meet the criteria set by Piaget. They also correspond with the stages of the Model of Hierarchical Complexity (MHC) of Commons et al.(2002). The MHC model provided a thread of increasing intellectual complexity which West followed to demonstrate how these important characteristics of stage development pertain through the various theories.

The Commons et al.'s model provided domain-general description of the recombination and reorganisation of simple elements into abstractions and complex systems as

development progresses. In a hierarchy of stages (*from* 0 - *to* 13), this model represents the complexity of the mental processes that can be used to resolve challenging situations such as making sense of conflicting knowledge and making decisions in the absence of certain and complete information. A person's stage is evaluated and empirically determined by "the subject's successful performance on a task of a given order of complexity" (Commons et al., 2002, p. 1-2). West used this general model to investigate epistemological development through understanding the mental challenges that each stage represents.

Based on the study of Dawson (2004) and Kitchener and Fischer (1990), West illustrated the correlation between the final stages of the MHC model with the stages of the models of Perry (1970) and King and Kitchener (1994). West identified through this analysis a model that provides "an additional perspective to observe the similarities among the different theories" (West, 2004, p. 69). Her conceptualisations are presented in the following table (Table 5.5). Promising as it is, there is still a need for further investigations of this kind to deepen the understanding of the complexity of the intellectual tasks involved at all stages in the different theories to better understand the similarities between them.

MHC	Hierarchical Transformation	Perry	Belenky et al.	Baxter Magolda	King and Kitchener	West
(9) *Abstract*	Abstractions emerge at this stage. However, in the absence of a way to coordinate abstractions, the definitions and values of abstractions that constitute knowledge are received from authorities.	Dualistic (1,2) *Absolute *Right or wrong	Silent *Not generalized *Received *Absolute *Unambiguous	Absolute * Certain	1-2 1- Absolute 2- From authorities	**1 Absolute** *Certain *Unambiguous
(10) *Formal*	One aspect of two or more abstractions can be coordinated. Because all views are considered equal, knowing can be based on unevaluated evidence from any source. If there is support, then you can know.	Multiplicative (3,4) *Uncertain *Different for each person	Subjective *Based on situation-specific evidence.	Transitional *Partially certain, Partially uncertain Independent *Uncertain because everyone has own beliefs	3 *Transiently uncertain 4 *Uncertain *Idiosyncratic *Self-centered	**2 Personal** *Uncertain *Based on knower's opinion

(11) *Systematic*	Multiple elements of related abstractions can be coordinated. Authorities' rules and definitions are used to compare conclusions and determine best solutions within single domains.	Relativistic (5,6) *Uncertain *Contextual *Supported by evidence	Procedural * Objective *Interpreted differently depending on perspective *Result of deliberate, systematic reasoning: *Either separate or connected	Contextual *Based on situation-specific *Contextual	5 *Uncertain *Domain – specific *Contextual	**3 Rule-based** *Uncertain *Based on Interpretation of domain-specific rules
(12) *Meta- systematic*	Coordination and comparison of different systems is possible to determine if they are equivalent. Equivalence or superiority can be demonstrated through application of principles that guide the evaluation of supporting evidence.	Committed (7+) *Includes knower's beliefs *Is the knower's responsibility	Constructed *Shaped by knower *Combination of separate and connected knowing		6-7 *Uncertain *Constructed *Based on interpretation of evidence *Includes knower's beliefs	**4 Evaluative** *Uncertain *Personally meaningful interpretation of evaluated evidence *Iterative process, includes all available evidence

Table 5.5: Description of Knowledge at each of the Stages of Epistemological Development based on the Theories of Common et al., Perry, Belenky et al., Baxter Magolda, King and Kitchener, and West

The discussion of the above sections reasserts the viewpoint that Perry's work laid the foundation for new research. Such research aimed to extend, challenge and build into the scheme. This review discussed as well aspects of similarities and differences between these models emphasising the complementary contribution they all provide for our understanding of student development. The final section of this review will discuss another very important aspect of Perry's scheme that sparked considerable research. It is the assessment of Perry's Scheme of Intellectual and Ethical Development.

5.4.5 Assessing Students' Development Using the Perry Scheme

Assessment is viewed as the crucial key to using student development theory to describe students' development, monitor developmental change and apply this knowledge to program design and evaluation (Baxter Magolda, 1987b; Hanson, 1983). There has been considerable interest in assessing development as defined by Perry mainly because the original interview format used in the longitudinal studies was almost completely unstructured. This was largely because, by design, Perry and his team had no specific initial focus of inquiry for their study and the model emerged, ultimately, from the qualitative analyses of the interviews (see previous section on the original study). Such interest produced quite a number of assessment techniques that have been grouped into two major categories: *production* measures and *recognition* measures (Baxter Magolda, 1987b; Stonewater, Stonewater, & Hadley, 1986).

Production measures embrace 'interviewing (open or closed content) and other free-response modes like (unstructured writing essay instruments and verbal reformations of prepared comments)' as assessment techniques: the *KneWi* or *Measurement of intellectual Development (MID)* of Knefelkamp (1974) and Widick (1975). It is argued by many researchers (Baxter Magolda, 1987b; Cohen & Manion, 1994; Gay, 1981; Moore, 1989; Stonewater et al., 1986) that such measures provide more accuracy as they enable participants to project their own frame of reference into their responses. They also enable researchers to investigate and probe interesting or ambiguous issues. This accuracy is, however, perceived to be at the cost of practicality. This is because using such measures is time consuming, requires extensive training to administer, rate and analyse the data and is difficult to use in situations where immediate feedback is needed or where the study sample is large.

Scales, inventories and instruments such as *Scale of Intellectual Development* (Erwin, 1983), and *Parkers Cognitive Development Inventory* (Parker, 1984) used in the recognition category are objectively scored, easily administered and very practical yet they are "of questionable accuracy because they sacrifice the production of response and restrict the respondent's freedom to project his or her own frame of reference" (Baxter Magolda, 1987b).

Such division about data collection contributed to the suggestion that two types of assessment instruments are necessary: a complex, subjective process (usually *production* of response) for theory refinement and a simplified process (usually *recognition* of response) for practice. The dilemma is in the implied premise that accuracy and practicality are mutually exclusive qualities in instrument development (Baxter Magolda, 1987b). Having this in mind, there have been many research studies that aimed at either bridging the gap between the two approaches or developing new methods of assessment that ensure both accuracy and practicality.

Some studies have explicitly examined the relative worth of the different assessment techniques. Stonewater et al. (1986), for example, conducted a study in which they compared Erwin's (1983) Scale of Intellectual Development *SID* (an objective instrument) with Allen's (Allen, 1983) *Paragraph Completion Instrument* (a free-responding instrument) to explore the extent to which they related to Perry position scale. Similarly, Baxter Magolda (1987a) used the Measure of Epistemological reflection *MER* (a standardised measure) and compared it with independent, open-ended semi-structured interview. Such studies contributed significantly to research on assessing students' development using the Perry scheme. They made it possible to predict a subject's position on the Perry scheme by administering instruments that are both practical and accurate. Such research is in its preliminary stages as there have been many limitations in both studies that made the researchers stress the necessity of replicating them again to obtain more conclusive results.

Other research has attempted to construct new assessment instruments. Taylor's (1983) Measurement of Epistemological Reflection *MER* is a commonly used example. It is a written instrument that addresses six domains of thinking: decision making, the role of the learner, the role of the instructor, the role of peers, the role of evaluation and the nature of knowledge. Each domain is assessed through a general question to focus the subject's thinking on the domain followed by questions to obtain more insight into the subject's justification and thinking. Essential to this type of instrument is a scoring manual that aims at training raters on how to identify clearly qualitative differences in subjects' justifications for their thinking as manifested in their responses (Baxter Magolda, 1987b; Baxter Magolda & Porterfield, 1988).

Moore's (1989) Learning Environment Preference *LEP* instrument is the most widely used recognition instrument. Based on MID's position cues, statements were extended and redefined to constitute a four-point Likert scaled instrument of 60 items. Each item is rated in terms of its significance to the person's ideal learning environment for five specific domains: view of knowledge, the role of the instructor, the role of the student and peers in the classroom, the classroom atmosphere and the role of evaluation. Students' responses are scored using a rating formula that indicates students' position on the Perry scheme from position 2 to position 5. Moore's instrument is considered as a pioneer objective measure that can be administered and scored without having to go through rating training programs or manuals. Nevertheless, there have been some limitations as to the validity, reliability and the sample used in Moore's initial study:

1. though correlation between LEP and MID ratings suggest a conceptual overlap, it is not significantly high as would be expected.

2. in such a study construct validity using coefficient alpha revealed a problematic area of ambiguity with items representing position 3.

3. the sample used was too homogeneous and did not reflect an adequate number of minority, non-traditional aged students or graduate students.

For the above reasons, more studies are recommended to gain further confidence in using this instrument.

It seems clear that the lack of a single standard for measurement of the Perry scheme has produced a wide range of instruments. Though this could be argued as a necessary phase in research on the scheme measurement, there remains a critical need for a solid, heuristic, objective instrument that – unlike the significant efforts mentioned above:

1. is able to accommodate the ongoing theoretical refinements of the scheme,

2. does not require specific lengthy or costly raters training for scoring purposes,

3. has a flexible 'ceiling effect'. This means that it could be used with various populations and diverse cultural contexts – not necessarily constructed just for western traditional college-age students,

4. is manageable to use in terms of the 'reality' of research and possibilities of data collection. Short, simply constructed and instructed instruments provide the possibility of higher returns from participants. Though 'the shorter, the better', it is unquestionably important not to sacrifice the conceptual basis or validity of the study,

5. would provide a tool that would be accessible to a wider audience of researchers and practitioners to use with some confidence.

Such considerations have been the incentive for constructing a new assessment instrument to assess the Perry scheme in the Centre for Science Education in Glasgow University. Central to such approach is Johnstone's conceptual modification of the scheme. These continuing endeavours started off with the initiative work of Harvey (1994) followed by two almost simultaneous projects of Mackenzie (1999) and Selepeng (2000), and culminating with the inventory of Al-Shibli (2003) upon which the currently used instrument is based, albeit with further modifications. Comparative discussion of this line of research and why the currently constructed and used one is different are detailed later.

On assessing the scheme, Perry had a different stance. He wrote (Perry, 1978) as cited in Brooks (1998) that "many faculties have begged me for a nice, quick, pencil and paper instrument that would measure their success in pushing students along the road to maturity. But I don't like the idea of 'applying' such theories to people, perhaps because I had good old nineteenth-century 'character development' applied to me" (p. 60). He simply was not in favour of any shortcuts or time saving devices in producing his observations. Despite this, many researchers and practitioners, as detailed in this section, have attempted to generate valid, reliable and efficient methods by which development can be measured. The best suggested answer, then, would be using a combination of these approaches where possible.

5.5 Conclusions

So far the review of literature in this chapter pointed out that Perry's theory is a corner stone and one of the most important theories that described cognitive and ethical development: one of the primary missions and commitments of higher education institutions in general and teacher training colleges in particular. Although the majority of research on the Perry scheme has proved the theory as valid, there is paucity in the literature of studies that are conducted in cross-cultural context, particularly any involving Middle Eastern countries. Similarly, not many studies applied it to students after graduation to follow up their development when going to the expected workplaces.

The first phase on this project aimed at achieving just that. It investigated the changes in pre-service teachers' beliefs (undergraduates and post graduates) about teaching and learning as compared to those of in-service teachers. This investigation is conducted in cross-cultural setting involving the Egyptian and the Scottish educational contexts. Perry's theory of intellectual and ethical development is the framework used in such investigation providing the following hypotheses:

- Undergraduate student teachers will start their university study with dualistic 'Perry A' type of thinking.
- As student teachers progress in their study, their beliefs will develop in a linear pattern from 'Perry A' to 'Perry C' type of thinking. The climax of their development will be in their final fourth year.
- Postgraduate student teachers' beliefs will hold the sophisticated relativistic 'Perry C' type of thinking.
- Teachers will show the most sophisticated relativistic 'Perry C' type of thinking in comparison with all other groups. They are assumed to be in 'Committed to Relativism' position. In Perry's hierarchical nature of development, this position transcends and subsumes relativism.
- This pattern of development is assumed to be the over all general tendency of development for all groups – even after considering the phenomenon of horizontal decalage.
- This overall pattern of development is assumed to be relatively the same to both the Scottish and Egyptian sampled groups.

Description of the structure of this phase of the study, including preparation of the instrument, sample selection, and information regarding data collection and analysis are presented in the following chapter.

Chapter Six

Research Methods: Phase One

6.1 Introduction

The recognition that teachers' thought processes influence their decisions, and eventually their practices has given rise to various innovative methods for collecting evidence that focuses on how to elicit teachers' beliefs (Armour-Thomas, 1989; Calderhead, 1996). Classroom observation alone is of limited value, as the cognitive processes under investigation are normally latent, covert and beyond immediate access to the researcher. As a result, the methods that have been developed concentrate on direct probes of teachers' thoughts, judgements and decisions. Generally, these methods have been borrowed from the fields of cognitive psychology, human problem solving, social anthropology, and the humanities.

There are methodological difficulties with identifying and measuring beliefs. Much research has been restricted to a single sub-component of teachers' beliefs and knowledge such as teacher efficacy (Tschannen-Moran, Hoy, & Hoy, 1998), or to context-specific domains such as subject matter knowledge (Florio-Ruane & Lensmire, 1990; Stipek & Byler, 1997; Stipek, Givvin, Salmon, & MacGyvers, 2001). Such narrow foci offered limited insights into teachers' larger belief framework, leading Pajares (1992) to suggest that examining teachers' beliefs in terms of context-specific structures unconnected to a broader system of beliefs is ill advised and probably unproductive. In the current study, it is this broader system of beliefs that has been the subject of investigation.

A self-report questionnaire was used in this phase of the study. The use of a questionnaire is believed to be one of the most appropriate and useful data-gathering instruments to survey opinions, beliefs and attitudes (Fraenkel & Wallen, 2000). A questionnaire that is properly designed can provide precise insights, claims Reid (2003), into how a large group of individuals think and the way they evaluate situations and experiences. It is also very efficient in terms of researchers' time and effort because a researcher can obtain data from large population of respondents in a relatively short time (Robson, 1994).

Using this kind of instrument, however, raises issues of data reliability; such questionnaires may force dichotomies that do not exist in the beliefs system. They may also lead the respondents in a particular direction which may or may not correspond with their own thoughts. However, it is important to note that directing the respondents' thoughts "does not of itself make the [questionnaire's] question[s] invalid or worthless" (Oppenheim, 1966, p. 42). Furthermore, being aware that self-reported procedures may not be particularly accurate guides to what actually happens on the classroom, they are used in this study only to identify teachers' '*intentions to act*' (Ajzen & Fishbein, 1980) and to provide a baseline for further deeper study. This accords with Ajzen's (1985) theory of planned behaviour which assumes that behaviour is well predicted from behavioural intentions.

This chapter, therefore, describes the research design of the first phase of the study and includes a description of the instrument, participating subjects, procedures used and data analysis. The goal of this phase was to examine, cross-culturally, the educational beliefs of pre- and in-service teachers using Perry's (1970) Scheme of Ethical and Intellectual Development in the Egyptian and Scottish contexts. Albeit interesting, it is worth stressing that the aim of this cross-cultural investigation is not to conduct a comparative study of the two educational systems where similarities and differences are illuminated. This study does not, therefore, intend to focus the investigation on political policies, educational policies, societal trends, cultural influences, effects or affects per se. The similarities and differences between the two systems, in these respects, are immense. The focus, rather, is on examining the belief patterns of student teachers and teachers in both contexts; thus, examining the cross-cultural validity of Perry's model. The focus is also on an examination, from the participants' perspectives, as to why their beliefs are as they are, how change can take place and what they identify as of utmost importance to achieve this change. Thus, the aims are threefold, first to examine the assumed universality of the scheme, second, to give student teachers and teachers the opportunity to voice their views and, third, to identify, if they exist, the fundamental factors that influence development (as conceptualised by Perry) irrespective of cultural differences. It is believed that examining the patterns of responses of student teachers and teachers of both contexts would throw an insight into the nature of beliefs change and would inform the current understanding of the factors that affect that change taking place.

6.2 The Aim of the Study

There were six aims for phase one of the study:

- To find out if and how student teachers' educational beliefs about aspects of learning and teaching change over time. If change occurs:
  - does it follow a linear path from a simple dualistic view to a more complex and sophisticated viewpoints?
  - is it an overall general tendency consistent through all dimensions or a domain-specific oscillating one?
- To ascertain how the educational beliefs of undergraduate student teachers compare with those of postgraduate student teachers. Do the different routes into teaching result in different belief frameworks?
- To compare the educational beliefs held by student teachers with those of practicing teachers.
- To investigate if the overall pattern of development is generalisable across both cultures: the Egyptian and the Scottish.

In investigating these issues, Perry's scheme of ethical and intellectual development was used. Perry's model provided a progressive pattern of development that was used as a criterion against which development or belief change can be compared or tracked. His theoretical framework provides a language that is convenient in describing developmental changes. Most importantly the generalisability of his theory assumes that the process of development, to an extent, transcends the context. This aspect is further explored in this study by examining it in a cross-cultural context.

In an attempt to answer the questions above, a cross-sectional and cross-cultural comparative study was conducted with six groups representing the same cohorts in each country. Of the six groups: four groups represented each year of a four year undergraduate degree course in education, one group represented postgraduate student teachers undertaking a one year PG Diploma in Education and the final group represented serving teachers.

6.3 Study Instruments

In the development of the questionnaire, it was important to accommodate the ongoing theoretical refinements of Perry's scheme and research on educational beliefs. The questionnaire had to be sensitive to various populations and diverse cultural contexts. The following sections describe the procedures that were undertaken to develop the dimensions, items, validity and reliability of the questionnaire in order that these sensitivities were embedded.

6.3.1 Development of the Instrument Dimensions

The development of the questionnaire was based on Johnstone's (1998) conceptual modification of Perry's scheme (see table 2.2 in chapter five). In his model, Johnstone's interest is mainly on four aspects or 'dimensions' of the students' learning: their perception of the nature of knowledge; the learner's role; the teacher's role and the nature of assessment. In the current study, two dimensions were added: the perception of the role of peers and the nature of ability.

While questions about students' perception of the role of their peers have been included in previous assessment instruments from which the current one is derived (Al-Shibli, 2003; Harvey, 1994; Mackenzie, 1999; Selepeng, 2000), they were not conceptualised as a distinct dimension. Rather they were implicitly included in the 'role of the learner'. However, from the perspectives of contextualist ontology and social constructivist epistemology, peers play a crucial role in the process of knowledge construction and learning, as they constitute the major social context of everyday classroom life. Moreover, perceiving peers as a legitimate, capable, and reliable source of knowledge and assessment – as 'Perry C' would believe – is at the heart of social constructivist teaching practices (Greer, 1997). In this study, therefore, 'the perception of the role of peers' was given more emphasis theoretically through its addition as a separate dimension and empirically through probing various aspects of it.

In an attempt to capture the complexity of personal epistemology, some researchers have developed a special interest in the influence learners' beliefs and perceptions of ability have on learning (Chiu, Hong, & Dweck, 1994; Dweck, 1986, 2000; Dweck & Leggett, 1988).

Dweck (2000) has identified two contrasting implicit theories of how individuals perceive 'ability'. She called them the 'incremental' and the 'entity' theory of ability. The incremental view sees ability as a malleable, inflatable quality, capable of expansion, whereas the entity view sees ability as an invariant fixed trait, a frequently innately determined or 'God-given' quality that characterises the person and is stable across contexts. A dualistic thinking view of ability seems to underpin the 'entity' theory: a view of either 'you have the ability' or 'you do not'. The 'incremental' theory seems to have a more sophisticated relativistic view of ability, its nature and how it is defined, developed and indeed appreciated.

Both views trigger contrasting approaches to learning (Dweck, 1986, 2000; Dweck & Bempechat, 1983). Those who believe in the entity theory of ability display helpless behaviours in the face of difficult academic tasks. Those who believe in the incremental theory of ability persist and show greater resilience in the face of difficult tasks. These 'helpless' and 'mastery-oriented' responses reflect two different levels of interest, motivations and engagement with learning. Learners differ in their strategies for goal achievement as well as their readiness for conceptual change (Patrick & Pintrich, 2001). The energy and motivation experienced by mastery-oriented learners form the internal impetus for personal development and maturity. This impetus,

> seemed compounded of many "motives": sheer curiosity; a striving for the competence that can emerge only from an understanding of one's relation to the environment; an urge to make order out of incongruities, dissonances, and anomalies of experiences; a wish for a community with men looked upon as mature; a wish for authenticity in personal relationship; a wish to develop and affirm an identity; and so on. (Perry, 1999, p. 57-58)

Teachers' beliefs about ability affect their views of the learners, how they approach their teaching, their response to mistakes and the overall quality of the classroom environment. Teachers' with a mastery-orientation would create a classroom environment that offers rather than 'presses' opportunities.

As individuals' epistemological beliefs about knowledge are related to beliefs about the ability to acquire this knowledge, it was included as an additional dimension to Johnstone's model.

6.3.2 The Construction of the Instrument's Items

The development of an item pool started from drawing items from inventories created by Al-Shibli (2003), Mackenzie (1999) and Selepeng (2000). Each of these inventories were based on the conceptualisations of Perry's theory of intellectual and ethical development as

modified be Johnstone (1998). All three inventories have been proven valid and reliable 'Perry instruments'. They have also been used in different cultural contexts: Oman, Scotland and South Africa. Other instruments such as Dweck's (2000) self-reported questionnaires, Perry's interview scripts and Greer's (1997) constructivist teaching practices inventory were also consulted when the first draft of the current inventory was constructed.

The initial draft of the current inventory included a pool of 64 items, of which 22 items were derived from the three 'Perry instruments' mentioned earlier. This first draft was, then, subject to revision, comments and consultation with the researcher and two experts: a lecturer and a professor in Education; both published in terms of student teachers' and teachers' beliefs and attitudes; both lecture on theories of learning, models of cognitive development, attitudes towards learning, etc. Not only they have had long experiences with Perry's work, they also had extensive classroom teaching and school administration experience. After meticulous discussions aimed to detect ambiguities, sources of confusion and repetitions, these items were reduced and priority was given to 40 items. These items were then re-examined for cultural appropriateness and content validity. They were translated and submitted for a panel of judges for both the Arabic and the English versions, pre-tested and then examined closely to confirm the final 27-item draft. In this process, the production of a relatively short and manageable questionnaire was of interest. These procedures are discussed further in the following section.

The resulting questionnaire consisted of four parts (Appendix 6.1):

- personal information,
- instrument questions on Perry's theory,
- an open-ended part where participants are asked to elaborate on any of the items or the issues included in the questionnaire if they wish to and
- a question inviting students for follow up interviews. Students were asked to indicate if they were willing to take part in a follow up interview. Details of these interviews will be discussed later (Chapter Nine).

Instrument questions were constructed using two approaches: the Likert method (Likert, 1932) and Osgood's semantic differential technique (Osgood et al., 1957); thus, constructing, respectively, 9 and 18 items of the 27-item questionnaire. To follow is a discussion of these methods, their construction and scoring techniques. A critique of the advantages and disadvantages of both techniques is presented to provide the rationale of how they were constructed and how they were differently approached in the scoring of the current instrument.

The Likert Scaling

The Likert scale (Likert, 1932) is considered as one of the best-known methods of attitude scaling. Compared to the method of paired-comparisons devised by Thurstone (Thurstone, 1931; Thurstone & Chave, 1929), Likert's technique was less cumbersome and laborious. This, together with the discovery that it correlates highly with Thurstone's scales (Edwards & Kenney, 1946), contributed to its popularity.

In this technique a large pool of items is chosen intuitively for their relevance to the attitude object. These items, in most applications of this technique, consist of statements of belief, statements about behaviours or statements about affective reactions towards the attitude objects (Fishbein & Ajzen, 1974; Kothandapani, 1971; Ostrom, 1969). Likert items are selected so that agreement with the item represents either a favourable or unfavourable attitude towards the attitude object. Respondents are then required to place themselves on an attitude continuum for each statement starting from 'strongly agree', to 'agree', 'neutral', 'disagree' and 'strongly disagree'. These five positions are given simple weights of 5, 4, 3, 2 and 1 or –2, –1, 0, +1 and +2 for scoring purposes. In such a process, a high score could mean a favourable or unfavourable attitude dependant on the choice of weighting allocated by the researcher. Consistency of the scoring direction (bearing in mind negative and positive statements) and the number assignments are considered arbitrary. Additional variations of the Likert technique have included the provision of more or less positions than Likert's five-point scale.

Having scored each item from, for example, 5 to 1, a total score is obtained by adding up item scores. If, for instance, the questionnaire consists of 27 items, then the possible range of total scores is estimated to be from 27 to 135. Dependent on the respondents' scores, it is possible to identify greater or lesser degrees of positive or negative attitudes towards the attitude object.

Likert focussed on the unidimensionality or homogeneity of his scale. A unidimensional scale is defined by Oppenheim (1966) as making sure that all the items would measure the same thing. DeVellis (1991) defines such a scale as "consist[ing] of a set of items that correlate well with each other" (p. 25). Therefore, an internal-consistency method of item-analysis is used to decide which statements are the best for the scale. Ideally, this item-analysis procedure should take place by correlating each item with some reliable and external criteria of the attitude that is to be measured. However, because such external criteria are not always available, the best available measure of the attitude concerned would be the total item pool that had been carefully constructed (Eagly & Chaiken, 1993; Shaw & Wright, 1967). Based on correlating each item with the total score of the pool, the items with the highest correlations are retained. The ultimate goal of this method is to produce items that will at least be consistent and homogenous. The assumption is that they will all be measuring the same thing and the scale subsequently is more likely to be valid.

Likert (1932) accomplished his goal of developing an attitude scaling technique that could yield reliable and valid scales. When compared to Thurstone scale, the Likert scale has frequently been found to be of greater reliability (Seiler & Hough, 1970): a reliability coefficient of .85 is often achieved (Oppenheim, 1966). Apart from their high reliability and relative ease of construction, the Likert scale has two other advantages: first, it provides more precise information about the respondents' degree of agreement or disagreement. Second, its construction allows the possibility of including items whose content is not obviously related to the attitude in question. Unlike other techniques (Thurstone, 1931), rigorous sifting of statements is not required. This allows not only for the subtler and deeper ramifications of an attitude to be explored, but also for uncovering the strands and interconnections of its various components (Oppenheim, 1966).

Despite these advantages, there are three serious points of criticism levelled against this type of scaling. The first concerns the 'unidimensionality' that this technique aims to achieve (inferred mainly from high item correlations with the total score). This procedure is described by Reid (2006b) in his '*Thoughts on attitude measurement*' as "quite an assumption!". There are, indeed, some issues with this assumption that are raised by other researchers (Eagly & Chaiken, 1993; Gardner, 1995; Oppenheim, 1966; Shaw & Wright, 1967). Considering the total score as the best available measure of the concerned attitudes involves what Oppenheim (1966) describes as "something like an act of faith" (p. 138) that might not necessarily be true. In addition, conducting correlations should not be with the total score but rather with the total score minus the score for the item in question. This would result in each item having a slightly different set of total scores with which to be correlated. This can have an impact on items selection. However, given that the item pool is large, many researchers, suggests Oppenheim (1966), do not give the subtraction procedure much importance by assuming that it will not produce much difference.

More importantly, the interpretation of high intercorrelations of the items as indicative of the scale measuring one latent attitude variable or reflecting a common construct is not necessarily true. High correlation may well be a result of two or more equally potent factors (Gardner, 1995; Shaw & Wright, 1967). Reid (2006b) claims that if the responses on two items correlate highly, this may not reflect similar measurements in that both items may be correlating with something else. The danger of such interpretation is manifested in the assumption that all items are measuring one thing and therefore are valid. Such an assumption is rather like "trying to pull ourselves up by our own bootstraps" (Oppenheim, 1966, p. 138) as it does not necessarily guarantee the validity of the items used.

Unlike other methods (e.g. Guttman, 1941), Eagly and Chaiken (1993) noted that there are no built-in tests of dimensionality in this type of scaling. It is impossible, therefore, to make statements about the underlying dimensionality of the Likert scales without further statistical analysis. Often factor analysis is employed as an adjunct to items correlations as a means to assess the dimensionality of the scales. Interestingly, when factors are analysed, they frequently yield more than one dimension.

There is yet a further problem. In conducting such correlations, Pearson's correlation is usually used. As a statistical technique, Pearson's correlation is based on some kind of approximation to normality of distribution of the studied phenomena in the data obtained (Reid, 2006b). In social science research, this is not a common situation as non-normality often occurs. This is particularly true when it comes to the study of attitudes.

Because attitudes vary in quality from highly positive to highly negative, it implies that there is a point on the attitude continuum at which the quality of the attitude changes from negative to positive (or vice versa). The identification of this point marks the second main disadvantage of the Likert technique; the scale offers no metric or interval measures and it lacks a neutral point. It, therefore, becomes difficult to know where, exactly, scores in the middle ranges change from mildly positive to mildly negative (Oppenheim, 1966; Shaw & Wright, 1967). In this regard, it is worth noting that the 'undecided' point on the scale is often considered as a zero or neutral point of an item, and, by analogy, the zero point of a scale might be taken as the attitude score corresponding to the score that would be obtained if the individual checked 'undecided' for every item in the scale. This interpretation is, however, ambiguous (Shaw & Wright, 1967). The neutral point is not necessarily the midpoint between the two extreme scale scores. This is particularly true since the scores in the middle could be due to lack of interest or enthusiasm, lack of knowledge, or lack of attitude in the respondent (leading to many 'uncertain' responses). Also, such a score could be achieved by checking the 'strongly agree' for half of the items and 'strongly disagree' for the other half, or through some other similar combination of agree-disagree responses. With such possibilities in mind, the neutral point would be difficult to locate and even more difficult to interpret. This is a problem, argue Shaw and Wright (1967), in attitude measurement that has not been solved, either theoretically or practically. Some theories (e.g. Krech & Crutchfield, 1948), in this respect, quite soundly suggest that attitudes always have either a positive or negative sign; if they have no sign (i.e. are neutral or at the zero point) they cannot be called attitudes at all.

The implication is that though the Likert-type scales are often held reliable and valid, the exact level of the measurement of the resulting scale scores is still unknown (Shaw & Wright, 1967). Moreover, because it, unlike other techniques (Guttman, 1941; Thurstone, 1931), does not have any internal checks for its representative measurement properties, it becomes difficult to say whether it yields interval or ordinal level of measurement (Eagly & Chaiken, 1993). Shaw and Wright (1967), therefore, suggest that the Likert Scales should be treated as ordinal scales. In that respect, it is worth noting that recent developments in item response theory (e.g., Birnbaum, 1968; Rasch, 1960) appear to provide a basis for assigning metric properties to various psychological tests. Although these innovations could be applied to attitude scaling, Eagly and Chaiken (1993) believe that researchers have not yet taken much advantage of them.

Because the scores received in each item are summed to obtain the respondent's a total score on the attitude scale, the Likert scale is well known as the method of summated ratings (Eagly & Chaiken, 1993). The same total score obtained by various respondents

could indicate their place on the assumed attitude continuum. Embedded in this is the third most serious criticism directed against the Likert technique. It has to do with its lack of what Oppenheim (1966) describe as 'reproducibility'. As has been mentioned in the previous point, the same total score does not indicate which statements each of the respondents agreed with and which they disagreed with. This single figure could indeed be obtained in many different ways. As such, it could be argued (Johnston, 1982; Oppenheim, 1966; Reid, 2003, 2006b), that a single score has little meaning or that two or more identical scores may have totally different meanings. For this reason, Oppenheim (1966) claims "the pattern of responses becomes more interesting than the total score" (p. 140). This is further accentuated by Reid's (2006b) assertion that combining scores hides the rich details arising from each question. The distribution in each separate question, he claims, is what matters. Such arguments informed the way the data obtained from the current instrument was analysed. More about this will be discussed later.

The Semantic Differential Approach

The semantic differential approach originated from the work of Charles Osgood in the 1950s (Osgood, 1969a; Osgood et al., 1957) as a technique for measuring meaning. It grew out of research at Dartmouth College in the late 1930's on synesthesia*. Typically, a single word (or phrase) is the construct of interest, and respondents help the researcher differentiate the meaning of that construct by responding to several pairs of bipolar adjectives which are scored on a continuum running from +X to –X. In theory, each bipolar pair (scale) can be represented by a straight line (semantic space); several such pairs or scales form a multidimensional geometric space (Osgood, Suci, & Tannenbaum, 1969; Osgood et al., 1957). Thus, when respondents respond to a set of pairs or scales as they rate a concept, those individuals are, in effect, differentiating the meaning of that concept in intensity (degree from the origin along each semantic space) and direction (positive or negative along each semantic space). The larger and more representative the sample, the more thoroughly that space is defined as whole. Determination of the minimum number of orthogonal dimensions (or axes) which make up the dimensionality of the semantic space allows maximum efficacy in defining that semantic space (Osgood et al., 1969; Osgood et al., 1957).

Through the extensive use of factor analysis of the meanings of many concepts, Osgood and his associates (1957) found that the semantic space can be accurately determined by as few as three dimensions labelled 'Evaluation', 'Potency' and 'Activity', though other factors (such as novelty, receptivity, and tautness) may also play a part. These three dimensions are loosely thought of as 'good-bad', 'powerful-powerless' and 'fast-slow' dimensions. Subsequent research confirmed this analysis (DiVesta, 1966; Heise, 1965;

* "A phenomena characterising the experience of certain individuals, in which certain sensations belonging to one sense or mode attach to certain sensations of another group and appear regularly whenever a stimulus of the latter type occurs" (Osgood, 1969a, p. 26).

Wright, 1958) and indicated that these three dimensions of meaning were common across cultures (Osgood, 1969b; Tanaka, Oyama, & Osgood, 1969).

The evaluative dimension has been found accountable for the largest amount of variability among scale ratings and was identified by Osgood and his associates (Osgood et al., 1957) as synonymous with attitudes. Subsequently, bipolar adjectives scales that load on the evaluative dimension are used to measure the direction and intensity of an individual's attitude towards the object being rated (Osgood & Suci, 1969). Hence, the semantic differential emerged as a measure of connotative meaning and attitudes. Its use in attitude measurement, however, has been considered as a "special application of the technique" (Shaw & Wright, 1967, p. 30) and a "spin-off" (Reid, 1978, p. 14) from Osgood's original work. The semantic differential is, therefore, considered more a method of measuring attitudes than a method for constructing attitude scales. On the other hand, Shaw and Wright (1967) argue that "it may be thought of as an attitude scale, although the particular items included in the scale may vary" (p. 30).

In applying this technique, respondents are offered a set of seven-point bipolar scales. The task is to rate the attitude object on each of those scales indicating both the direction and intensity of their feeling towards it. Each scale appears as follows:

Fair ☐ ☐ ☐ ☐ ☐ ☐ ☐ Unfair

The bipolar scales that seem to have high loadings on the evaluative factors (.75 or more) are: good-bad, beautiful-ugly, sweet-sour, clean-dirty, tasty-distasteful, valuable-worthless, kind-cruel, pleasant-unpleasant, bitter-sweet, happy-sad, sacred-profane, nice-awful, fragrant-foul, honest-dishonest and fair-unfair (Shaw & Wright, 1967). In constructing scales, the number of bipolar items used varies from all fifteen pairs of words listed above to a few (three or five) of the clearly evaluative pairs.

Employed in this way the technique has, over the years, been developed to meet the different needs of various research studies. Oppenheim (1966, p. 205) in his book on *Questionnaire design and attitude measurement* presents an example that seems to group some of these developments. It is part of a set of rating scales used to study and compare people's perceptions of different brands of cigarettes (Table 6.1).

Cool	☐ ☐ ☐ ☐ ☐ ☐ ☐	Hot
Thick	☐ ☐ ☐ ☐ ☐ ☐ ☐	Thin
Leaves a clean taste	☐ ☐ ☐ ☐ ☐ ☐ ☐	Leaves an unpleasant aftertaste
Burns the back of your throat	☐ ☐ ☐ ☐ ☐ ☐ ☐	Doesn't burn your throat
Poor man's cigarette	☐ ☐ ☐ ☐ ☐ ☐ ☐	Rich man's cigarette
Mild	☐ ☐ ☐ ☐ ☐ ☐ ☐	Strong
Masculine	☐ ☐ ☐ ☐ ☐ ☐ ☐	Feminine
Cigarette for smoking at work	☐ ☐ ☐ ☐ ☐ ☐ ☐	Cigarette for smoking when going out
A quick smoke	☐ ☐ ☐ ☐ ☐ ☐ ☐	A long smoke
Makes you cough	☐ ☐ ☐ ☐ ☐ ☐ ☐	Doesn't make you cough

An Example of Osgood's Semantic Differential Technique

One feature of such developments noted by Oppenheim's is that the ratings deal, not only with 'factual' aspects (such as mild/strong or thick/thin), but also the 'images' of certain brands or products (poor man's cigarette/rich man's cigarette), or perhaps the companies that produce them, describing the latter on such dimensions as modern/old-fashioned, weak/powerful, responsible/irresponsible and so on.

Another feature of these developments is manifested in the selection of the adjectives used for the rating scales. They deviate from the previously mentioned fifteen pair of words. Oppenheim (1966) also states that, "[i]t is possible and often useful to obtain responses to rating scales that hardly seem appropriate to the concept under consideration, such as masculine/feminine" (p. 206). In addition, different structures were used: single word adjectives, adjectival phrases and complete sentences. Collectively, these various forms have been extensively used in different research studies on attitudes (Ajzen, 2002; Alhodery, 2005; Al-Lawati, 2003; Al-Qasmi, 1999, 2006; Byrne, 1985; Ghani, 2004; Hadden, 1981; Haghanikar, 2003; Harvey, 1994; Jung, 2005; Nasr, 1976; Reid, 1978; Reid & Skryabina, 2002, 2003; Rickwood, 1984; Serumola, 2003; Skryabina, 2000; Vianna, 1991). The various instruments used were shown to be valid and reliable. In addition, these instruments were administered to various age groups (primary school pupils of ten and eleven years old, secondary school pupils and students at university levels) and in various cultural contexts (Scotland, Libya, Oman, Malaysia and South Korea).

There has also been wide variation in using six-point, five-point or three-point rating scales. This marks another subsequent development in the use of the semantic differential. The use of six-point scale, in particular, is considered innovative, as it does not provide respondents with a neutral point. The reason behind such a structure is to encourage respondents to be more critical, make a decision and choose an end to (extremely, quite, and slightly) agree or disagree with.

In choosing the scales, care should be taken that the two ends at the extremes really are opposed and do define some kind of scale or dimension between them (Eagly & Chaiken, 1993; Nussbaum, 1989; Shaw & Wright, 1967). This aspect of Osgood's work, however, has also been subject to development. While some extremes have more than one opposite (for instance, sweet/bitter or sweet/sour), others have none (for instance, burning). Therefore, instead of having two extremes, in some cases, one extreme and one neutral end are used (burning/not burning). Also, in some cases, two ends – not necessarily clear opposites but perhaps possible ones – are used to represent different viewpoints thus defining a certain dimension (cigarette for smoking at work/ for smoking when going out).

Another aspect of development is noted in Wells and Smith's (1960) suggestion of labelling the semantic differential positions to facilitate the rating of intensity. They conducted a study to investigate whether the proposed adverbial quantifiers (extremely, quite, and slightly) serve any useful function. Semantic differential scales with and without adverbial quantifiers were employed with a survey sample of 400 housewives. Findings have indicated a substantially greater differentiation in this technique when adverbial

labels were used. When adverbial labels were not used, it led to many more ratings at the end points of the scales. Furthermore, interviewers reported that the adverbial labelled scales were better understood by the respondents and led to greater cooperation in the rating task.

It is obvious that, if the semantic differential is simply regarded as a set of rating scales, it can be used to show the 'semantic space' of several objects or concepts to a respondent or to various groups. It can be used also to show how the concepts relate to each other if not in all their semantic and attitudinal patterns of associations, then, at least in terms of similarity and differences (Oppenheim, 1966).

To that end, similar to the Likert method, scores are derived by assigning integral weights to each position on the rating scale. These ratings are usually scored from 1 to 7 or from –3 to +3. In doing so consistency in assigning numbers and adjustment for the directionality of the scales are considered important. Scores on the individual bipolar scales are then summed or averaged over all the scales representing a single factor. This single number represents one respondent's or one group's reaction to one concept on one of the semantic differential dimensions (Heise, 1970). Assuming that the various scales load highly on a given dimension, are comparable in size, and are of approximate equal relevance so that the rating variances are approximately equal, then Heise (1970) claims, it is reasonable to weight the scale equally to calculate the factor scores and the mean of these ratings. He goes on to state that, "the group means can be viewed as estimate of true factor scores for the particular group or culture – they are the points around which individuals vary. Group means computed from SD [the semantic differential technique] tend to be extremely stable" (p. 242). A map can then be drawn to represent the profile of the respondent or the group towards the rating object.

An analysis of this profile can reveal the different ways in which several objects or concepts are rated on the same set of scales or how two or more groups differ in these respects. To achieve this Osgood and his associates (Osgood, 1969b; Osgood et al., 1969) used a "D-score" which summarises the degree of difference between concepts. In doing so, the intensity of the evaluative response, independent of its character, is the main interest. Therefore, the distance between the neutral point (or the origin of the semantic differential three-dimensional space) and the responses to the particular concept under consideration is calculated. If the neutral point of the scale was assigned a value of zero in the coding process, the factor scores also have their neutral point at zero. To obtain the "D-score" for an individual's responses on for example any two concepts, the differences between the responses are calculated on every scale, squared and then added up for the entire set of scales. By taking the square root of the sum, the distance-score or the 'D-score' for those two concepts are obtained.

By repeating this operation for all possible comparisons between any number of concepts under consideration, a triangular table, D-matrix or a diagram showing the distance score of every concept against all the other concepts, can be produced. Inspection of such a

matrix can be illuminating as it can reveal the relative similarity of the different concepts to the respondent. An example is provided by Heise (1970) to illustrate the meaning of the 'D-score'. In an experiment to examine the semantic relationship among the concepts 'Home', 'Office', and 'Work', he averaged the factor scores of the three dimensions of the semantic differential. By calculating the 'D-score' it was found that the distance between 'Home' and 'Work' is about 3.8 units while the distance between 'Office' and 'Work' is .8 units. Thus, the respondents' reactions to 'Work' are more similar to that for 'Office' than to that for 'Home'. The same procedures can be applied for a group, in which case, the ratings are added and averaged before pursuing with a calculation of the D-values. The same procedures can be applied for a group in which case the ratings are added and averaged before pursuing with calculating the D-values.

Relative to other attitude scales the attributes of the semantic differential appear acceptable. Osgood and his associates (Osgood et al., 1957) have reported test-retest reliabilities ranging from .83 to .91. Osgood's work has the advantage of being carefully replicated and compared to other approaches. Jenkins, Russell and Suci (1957) for example, reported an average test-retest reliabilities of .97. Osgood et al. (1957) also presented evidence of validity as estimated by picking out known groupings in society and by correlating with other scales. Correlation with Thurstone scales ranged from .74 to .82 and with a Guttman scale at around .79.

Heise (1970) carried out a critical review of the semantic differential in attitude research. He surveyed its application in many studies to find out that it has been used with students, children, factory workers, housewives, juvenile delinquents and even illiterates. This is mainly because of its ease in setting up, administering and coding. In that respect Eagly and Chaiken (1993) state that, "[b]ecause the semantic differential uses adjectives... that are very general and heavily saturated with evaluative meaning, specific belief items do not have to be prepared in advance and scaled. Therefore, the bipolar scales of the semantic differential have been described as the attitude researcher's 'ever-ready batteries'" (p. 57). Also, because it does not depend upon items specific to a particular attitude object, the semantic differential allows for conducting comparisons of attitudes across different objects or concepts. It is thought of also as being time efficient and cost effective. The length of the test is suggested at a maximum of 50 judgements. Its high reliabilities and good validity checks against other forms of measurement has led Heise (1969) to state that after many years of application the semantic differential technique has stood the test of careful scrutiny and has become a standard and useful tool for social psychological research.

Thus, the semantic differential technique can be used in two distinguished ways either as an instrument to measure the connotative meaning of concepts or as an instrument for structuring some attitude domain. Its innovative application in the latter domain has, nonetheless, raised some problems with its use.

There is a problem that is much related to Osgood's original quest of trying to bring order to the connotative meaning of words though, in that respect, an assumption has been made that some concepts tend to have stable connotations with different people (Osgood, 1969a), The same is not necessarily the case when it comes to attitudes and beliefs. Beliefs, by their very nature, are subjective, complex, inter-related and sometimes contradictory. In the belief system it is common that incompatible beliefs could be held together especially if there is little cross-fertilisation happening among them.

Moreover, despite Osgood's and his associates' extensive research showing that certain adjectives generally indicate evaluative meaning, such adjectives may have more specific meaning in relation to particular attitude objects and issues. For example, in a particular analysis, the adjective pair *warm-cold* generally indicates evaluative meaning in rating people but would convey meaning that is less evaluative and more denotative in ratings of places. Osgood and his associates (1957) has called the tendency for particular scales to convey specialised meanings in the context of particular concepts as concept-scale interactions. Because of the possibility of such interactions Osgood and his associates suggest assessing the extent to which individual bipolar scales in any particular investigation can, in fact, be treated as forming a common evaluative scale. As in the Likert scaling, the assessment can be performed by correlating the respondents' scores on the individual scales and their scores summed or averaged across the scales (i.e., their total score) (Eagly & Chaiken, 1993). The assumption is that increasing favourability of respondents' total scores on the set of items should be accompanied by increasing favourability on the item. In addition, the factor structure of the bipolar scales can be analysed through the use of factor analysis. Such procedures are built on assumptions that have been previously criticised when discussing the Likert scale.

Similar to the Likert method and for the same rationale presented earlier, there are some criticisms levelled against the validity of adding the items up to have a total score, the metric and equal interval assumptions of the semantic differential scale and their direct dependence on considering the middle check position as the true zero point of the bipolar scale. In addition to the argument presented earlier, Heise (1969) states that considering the middle point as the true zero requires both ends of the scale to be real bipolar in the sense of being about opposite points in the semantic differential space. This means that both ends "would be about equidistant from the neutral centre point, and they also would be opposite one another so that a line passing between them would also pass through the centre" (p. 407). Mordkoff (1965) found that though some scales – typically those used most in semantic differential research – do meet these criteria, many others do not. For example, the two scales of 'masculine-feminine' and 'soft-hard' are clearly not true affective contrast. This has led Green and Goldfried (1965) to conclude that the assumption of bipolarity is generally unwarranted as there are some scales that do exist without meeting the assumption of true bipolarity. It is, therefore, inaccurate to consider the middle point of the scale as a true zero. Heise (1969), consequently, states, "The basic metric assumptions for the SD [semantic differential] are not quite accurate...[and that] while lack of a refined

metric may not interfere with most uses of the SD [semantic differential], this inadequacy could create problems in certain kinds of work" (p. 407-408). This is particularly true when it comes to studying attitudes (Reid, 2006b).

Such issues have led Eagly, and Chaiken (1993) to claim that the main disadvantage of the semantic differential is that its representational measurement properties are essentially unknown. Consequently, it is difficult to know what level of measurement is obtained or what properties the obtained attitude scores have.

Oppenheim (1966) claims that the value of this technique depends largely on the suitable choice of concepts and rating scales. Researchers, nonetheless, are somewhat less restricted in their choice of objects, which may well be largely determined by the nature of the investigation. Furthermore, some attitudes are not reducible to the simple form required for its application, which requires merely a phrase followed by a series of words (or phrase) antonyms (Reid, 1978). Also, in case of applying the scales to all concepts, clearly the problem of relevance or applicability must be considered (Heise, 1969; Oppenheim, 1966). Heise (1969), in his review of the methodological research on the semantic differential, stresses consideration of the individual differences of the meaning of certain adjectives to certain groups. There are individual differences in the size and character of the semantic space as "a substantial portion of variation in semantic differential ratings is due to individual differences and temporal variations in responses" (Heise, 1969, p. 406).

In attitude research, there is another issue that is related to the scale's factorial composition, which is not often available considering that evaluation is the most dominant factor in most studies (Heise, 1969; Oppenheim, 1966). Heise (1969) expressed his concern for the neglect of the use of the other two dimensions (Activity and Potency).

Heise (1970) claims yet another disadvantage of this technique. He argues that because of its simplicity, respondents could respond in a way that would be more socially desirable or that would put them in a favourable light.

This, indeed, brings up the discussion of another disadvantage– often labelled as '*Response Sets*' – associated with the use of rating scales in general. A discussion of their effects and how they were considered in the current study is presented before moving on to describe how both techniques (i.e. Likert and Osgood's scales) were approached in the design of the current instrument.

Response Sets and Rating Scales

'Social desirability' is one of various other response sets associated with using any rating scales such as – in the case of this study – Likert and Osgood. Oppenheim (1966) puts it saying, "[p]erhaps the chief danger of ratings lies in the ease with which they can be influenced, often by variables of which the rater [or the respondent] is unaware" (p. 84). Another response set has been described as '*acquiescence*' (Eysenck, 1962; Martin, 1964). It expresses respondents' general tendency to assent rather than dissent with the (Likert)

statements as they are presented. Other kinds of response biases include, for example, respondents' tendency to go for extreme responses or avoid using extreme responses favouring the middle points of the scale (i.e. *Central tendency bias*). Responses may also be biased by respondents' tendency to, instead of rating each item based on its attributes, let their responses be influenced by an overall feeling of like (*Halo effect*) or dislike (*Pitchfork effect*) that colours their reactions.

To counteract the effects of such biases, the items of the questionnaire were randomised to ensure as much independence of judgement as possible. Randomising the items had been in terms of the six dimensions of the questionnaire as well as in terms of the direction of the scales. The incorporation of positively and negatively worded items was also used. Moreover, the juxtaposed use of both scaling techniques (Likert and Osgood) also helped to offset some of the effect of any possible bias. With the Osgood items, the other end of the assumed attitude or belief continuum is defined. In various Osgood scales, the assumed socially most desirable items were allocated on the left and in others sometimes on the right.

It has often been argued that respondents hesitate to answer freely either from fear of disapproval, because they feel their privacy is being invaded, or for a variety of other reasons (Shaw & Wright, 1967). To ensure respondents' honesty in responding, great effort had been taken to inform participants verbally as well as in a written form with the purpose of the study (i.e. to explore their *own perceptions* of some aspects related to teaching and learning). In that respect, respondents were told that there are no 'right' or 'wrong' answers, what count is their views as they are. Their willingness to participate was ensured. Moreover, the anonymity of their responses was stressed. Respondents were assured that no responses whatsoever were going to be traced back to particular individuals. Hence, they were assigned the choice of giving or withholding their names. They were also assured that their individual responses would not be discussed with their colleagues, tutors, seniors or principles and that they are totally for research purposes that are completely independent of their coursework, exam results or job reports. Furthermore, to obtain frank and revealing responses, respondents were encouraged to give a snap answer recording their first immediate reaction to the question, thus, giving what is uppermost in their minds.

Despite all efforts, it is inevitable that some responses would be biased one way or another. However, given the large number of participants in the compared sampled groups, it was assumed that this would level out any possible biases taking place. Still, there is a need for more research on response sets or biases, including the kinds of people susceptible to response set; the kinds of items and tests affected by response sets; and whether or not their effect could or, indeed, should be neutralised (Lehmann, 1980). Similarly, Oppenheim (1966) believes that "More research is needed in response styles, since they affect scales and some kinds of respondents more than others, and there seems to be no easy way of detecting their influence or neutralizing it" (p. 118). Nonetheless, Kerlinger (1970; 1973) believes that while response set is a mild threat to valid measurements, its importance has

been overrated. While the effects and importance of response set or bias remain equivocal, in the current study much care had been taken to minimise their effects as much as possible.

Using Both Techniques in the Current Instrument: A Critique

For measuring attitudes, various techniques of attitude scaling have been developed or adopted to be used for that purpose (e.g. Guttman, 1941; Likert, 1932; Osgood et al., 1957; Thurstone, 1931). In the construction of the current instrument, two of those techniques were used: Likert's scaling and Osgood's semantic differential. In making the decision about which technique to be used, Oppenheim's (1966, p. 123) suggestion that "[i]t is impossible to say which method is best. Each has important desirable features, but each of them is also open to criticism. For our own inquiry, the best method is the one which is most appropriate to our particular problem." was considered.

The features of both techniques have been discussed previously. From such a discussion, it is clear that both techniques have the advantage of being easy to construct (Eagly & Chaiken, 1993; Oppenheim, 1966; Shaw & Wright, 1967) and have been widely used. A sizeable body of research has proven them to be more reliable than other scales with the same number of items (Tittle & Hill, 1967). Good evidence of validity has been presented for both techniques either by being able to pick out known groupings in society or by correlating highly with other more established scales. Both techniques are thought of also as being time efficient and cost effective. They are easy to administer for both individuals and groups. If constructed with a reasonable length, respondents find them easy to respond to. Moreover, because their construction allows for the inclusion of other items, whose content might not obviously relate to the attitude in question, this allows for exploring the subtler and deeper aspects of the attitude under consideration. It also allows for uncovering many of the strands and the interconnections of its various components. Furthermore, while the Likert scale provides more precise information about the respondents' degree of agreement or disagreement with the statement presented, Osgood's technique has the privilege of more accurately allowing the respondents to not only express the intensity of their responses, but also to choose their direction. This is mainly because the other opposite end of the scale is obviously defined.

Because the main interest of the current investigation is to explore the 'belief- patterning' of cross-sectional groups of pre- and in-service teachers in both the Egyptian and the Scottish contexts, both techniques are believed to be convenient for the purpose of the study. It is also believed that the juxtaposed use of both techniques will enrich the means by which responses are gathered; thus, ensuring accuracy and providing opportunities to have interesting insights into respondents' perceptions and beliefs. It can be concluded, then, that both techniques have their aspects of strength that are convenient for the purposes of the study.

Five-point and six-point rating scales were, respectively, used for the Likert scale and for Osgood's semantic differential. A mixture of both was used for most of the questionnaire's dimensions. In the Likert items, respondents were mostly presented with either a 'Perry A' or a 'Perry C' belief statement. It was assumed that whoever went for 'strongly agrees' or 'agrees' would endorse the way of thinking presented in the statement. Those who went for 'strongly disagree' or 'disagree' were believed to represent the opposite thinking position. Respondents who did not agree or disagree with the presented statement and who were unsure about where they stood were instructed to check the middle position; thus, representing 'Perry B' thinking. With the items that were based on Osgood's technique, the same procedure was followed. First, respondents were instructed to choose which end represented their views. Second, the stronger their belief was in the statement as presented, the closer the box they were to check next to it. However, because respondents were presented with both ends of the scale and were aware of the opposite alternative, it is believed that a greater degree of accuracy was achieved. The conceptualisations behind the classifications of the groups were discussed earlier (Chapter Five). Using that approach, it was possible to elucidate different positions of Perry's thinking from the presented statements. More details about this will be presented later in this chapter.

In that respect, the use of this approach and particularly of Osgood's semantic differential technique were important in identifying 'Perry B' multiplicity thinkers: a challenge that was not achieved in any of the previous Likert-based instruments such as Parker's (1984) and Zhang's (1995) inventories. These inventories were constructed with statements that represent dualism (position1-2), relativism (position 5-6), and commitment in relativism (7-9). Multiplicity (position 3-4) was not included "since items indicating multiplicity are so similar to those representing relativism that writing pure multiplicity items would be difficult" (Zhang, 1995, p. 89). The hierarchical nature of development as conceptualised by Perry gave the justification that "using relativistic thinking or making a commitment would subtend 'multiplicity'" (Zhang, 1995, p. 89). In this respect, it can be argued that the use of the Likert's method alone, in the way these inventories approached it (Parker, 1984; Zhang, 1995), might be insufficient in assessing development as conceptualised by Perry. This is particularly valid since it has been empirically evidenced that 'commitment in relativism' positions are not commonly exhibited in students at college years. This was also proven by subsequent modifications of Zhang's inventory as substantial reduction of the items representing this position of thinking took place (see Zhang, 1999). On the use of the semantic differential, Reid (2003) believes that this technique has some advantages over the Likert method: its ease of construction, the speed at which it can be answered and that both ends of the scale are defined. Nevertheless, the use of various techniques was strongly recommended (Oppenheim, 1966; Reid, 2003).

As has been mentioned earlier, the construction of this instrument is, indeed, built upon other inventories (Al-Shibli, 2003; Mackenzie, 1999; Selepeng, 2000) that were specifically developed to accommodate Johnstone's (1998) theoretical refinements of the scheme. This current instrument particularly develops Al-Shibli's inventory by including

items that reflect the two dimensions added to Johnstone's modifications of the scheme (i.e. perceptions of peers and perceptions of ability). In the previous inventories, the focus of investigation was to explore the perception of the targeted groups in relation to learning 'science' from the perspective of various scientific disciplines (i.e. biology and medicine). Therefore, in the current inventory, changes have been made so that the questionnaire's phraseology would suit the targeted group of student teachers and teachers and their beliefs about teaching and learning in more general terms.

The use of both Likert's and Osgood's techniques was what distinguished Al-Shibli's (2003) version of the questionnaire from previous versions where either Likert's scaling (Mackenzie, 1999) or Osgood's semantic differential (Selepeng, 2000) has been used exclusively. It is worth noting that, on the basis of Selepeng's and Al-Shibili's work, various modifications of the Osgood's technique had been made to suit the particular purposes of these research studies. Following their lead, in the current study, such scales, by their more imaginative approach, have been employed to explore aspects of pre- and in-service teachers' beliefs about various aspects of teaching and learning. In doing so, a six-point scale has been used. Moreover, instead of using adjectival pairs, one or more complete sentences have been used at each end of the scale. Each end is carefully constructed to spell out one way of perceiving the world representing, thus, one of Perry's thinking positions (either 'Perry A' or 'Perry C' thinking). As will be discussed later, great care has been taken to make sure that both represent opposite ends of 'Perry A' and 'Perry C' thinking.

In such a process, the assumption that respondents (student teachers and teachers) are believed to be consistent in their epistemological beliefs and, thus, can be characterised by one of the three thinking positions at any particular time was adopted (Schraw & Olafson, 2002). It is indeed rare for hybrid positions to occur among the different thinking positions simply because the views on many aspects across the different thinking positions are incompatible (Prawat & Floden, 1994). This stance is further emphasised by Perry's (1970) meta-theory (Pintrich, 2002) viewpoints. Perceived as a developmental model, Perry, early in his work with the scheme, endorsed a cognitive organismic view of development that favoured a more qualitative, unitary, holistic view of epistemological thinking. The different aspects of epistemological thinking and beliefs are conceptualised to cohere into a single position, stage, level, or phase that reflects an individual's qualitatively different way of seeing the world. Working further with the scheme, Perry came to modify his view by taking a more mechanistic meta-theory perspective to development (Pintrich, 2002). From this perspective, horizontal decalage can happen and can be predicted as individuals' positions on any of the dimensions could vary as a result of situational or contextual features. Despite these variations, Perry still believed in an overall general conceptual structure and tendency for the individual to make sense of the world. Such issues have been discussed in more details in chapters two and five.

Though touched upon empirically in the current investigation the assumption that student teachers and teachers' epistemological beliefs are relatively consistent across different

domains was endorsed in instrument construction. This issue of domain-generality or domain-specificity of epistemological beliefs is currently the interest of many research studies. Schommer (2002) has addressed this issue stating that "[m]ature individuals have a sense of self that is core. And that part of this sense of self is personal epistemology, an aspect of their epistemological beliefs that is domain general. This general core of epistemological beliefs may serve as the foundation from where their domain specific epistemological beliefs spring forth" (p. 112). Such a perspective was also embraced by Muis, Bendixen and Haerle (2006) in their review which attempted to synthesise and critically examine 19 empirical studies addressing the issue of domain-generality or domain-specificity of epistemological beliefs. They proposed a theoretical framework that incorporates both positions stressing both the domain-generality and domain-specificity of epistemological beliefs.

Both of those assumptions had made it possible to use Osgood's format in such an innovative way. Moreover, it is important to state that the main objective of the current investigation was not to assess respondents on the factual accuracy of each item or the possibility of its implementation but rather to go underneath the surface and identify their beliefs and the possible ways they endorse in making sense the world.

In that respect, it is crucial to know that each of Osgood's statements is perceived not in isolation but in the context of the other opposite end as well as in the context of the other preceding items. Collectively, these would direct respondents to respond in accordance with the feelings each item triggered in them (Dyer, 1995). For all of the above arguments and in light of the pilot study conducted (more about it will be discussed later in this chapter), it was therefore unlikely that respondents would be confused if presented with such a structure and containing complex statements.

Such a proposition was further accentuated since no problems with this innovative structure of Perry's instrument were reported when implemented in the studies of Selepeng (2000) and Al-Shibli (2003). Further use of the latter inventory with Scottish biology students on university level (Al-Qasmi, 2006) and Greek secondary school students (Danili, 2004) supports the use of Osgood's technique as such.

It is interesting to note that both techniques were used in Bailey, Conn, Hanks and Werner's study (2003) to measure software engineering students' attitudes towards the code inspection process. They reported that students' responses on scales of both techniques correlated with each other. Consistent with these findings are secondary and college students' patterns of responses in Al-Shibli's (2003) study. Looking at the results of his investigation, it is clear that some of the statements constructed using both techniques to discuss the same issue have shown reasonable consistency.

Having discussed the "important desirable features" (Oppenheim, 1966, p. 123) of both Likert's and Osgood's techniques, why and how they were used in the construction of the current instrument, it is important to note that "each of them is also open to criticism"

(Oppenheim, 1966, p. 123). While there are several drawbacks to these methods, three are most important. They are related to the assumptions of unidimensionality, the existence of a zero point and equality of intervals. More discussion about these aspects and how they informed the statistical analysis of the data gathered using these techniques is presented later in this chapter (section 6.6). First, an account of the procedures used to establish the validity and reliability of the instrument is presented.

6.3.3 Instrument Content Validity and Reliability

As been explained previously, the construction of the questionnaire was mainly based on literature related to attitude measurement as attitude scales have commonly been used to assess pre- and in-service teachers' belief systems about teaching (Hoy & Rees, 1977). On questioning respondents, Oppenheim (1966) states that:

> The function of a question in an interview form or a questionnaire is to elicit a *particular* communication. We hope that our respondent has certain information or attitudes on the subject of our inquiry, and we want to get these from him with a minimum of distortion. If it were possible to do this without asking him any questions and without the respondent having to " respond", that would be so much better – for the questions we ask, the possible misunderstandings they provoke in the respondent, the mental phrasing of his or her answers, and the recording of them – all have influences on the final result that we could well do without. Some people still design questions as if the process of interviewing or of filling out a questionnaire were rather like unloading a ship, with every item of cargo labeled and with a specific destination, picked out of the hold and set down according to pattern. In reality, questioning people is more like trying to catch a particularly elusive fish, by hopefully casting different kinds of bait at different depths, without knowing what goes beneath the surface! (p. 49)

Despite the common use of questionnaires in measuring attitudes and beliefs, it is important to know that "[t]here are... trades-off in everything, and questionnaire design is no exception" (Gross, 2004). Indeed, a major methodological problem with self-reported data concerns the extent to which these methods yield reliable and valid information.

Reliability, on the one hand, refers to the extent to which an instrument is *consistent* in measuring whatever it is purported to measure. Reliability in educational measurement generates considerable controversy (Reid, 2006b). Most of the statistical measures of reliability are measures of internal consistency. They offer more or less no evidence of test re-test reliability (Gardner, 1995; Reid, 2006b). Having indicated the complex, inconsistent and sometimes contradictory nature of how beliefs are organised in the belief system, such measures then would be "*completely inappropriate*" (Reid, 2006b, p.10). Moreover, similar to any academic test (i.e. math, chemistry, history, etc.), if every question in the questionnaire is considered as a different aspect of what is to be investigated and not a repeated set of questions asking the same thing then internal consistency becomes meaningless (Reid, 1978, 2006b). The evidence of investigations into internal consistency is that, if a student knows one area, s/he is might perform well in another. This, indeed,

does not say anything about the reliability of the test (Reid, 2006b). Split-half reliabilities are thought of as unhelpful (Reid, 2006b). This could be valid since attitudinal questions are sensitive than factual questions to change in wording, context, emphasis and so on such that it becomes almost impossible to assess reliability by asking the same question in another form since it will no longer be the same question (Oppenheim, 1966). Test and re-test procedures are, therefore, recommended as more genuine ways of checking the reliability of the used questionnaire. This, however, is not often practical or possible.

Reid (2003) suggests that if tests or questionnaires are designed carefully to avoid ambiguity, the items are moderately difficult and the length of the test/questionnaire is reasonable, then, reliability will not be a major issue. For assured test reliability, he adds, researchers are to use large samples, undertake careful pre-testing, check that test conditions are socially acceptable and use sufficient questions and cross checks. Reid (2006b) writes, "where it has been done, all the evidence suggests that, with good samples, and the carefully controlled use of surveys, reliability is high" (p. 11). Furthermore, in his paper on attitude measurement, Reid supports his argument by citing two studies where remarkable reliability had been achieved with instruments that meet these suggested criteria. In a study evaluating biology students' attitudes after trying new curriculum material, it was noted that, with two consecutive year groups of 550 and 750 students, the overall picture on each of the nine Likert-type questions asked was found to differ by less than 1% in every category of response. Similarly, in a recent study, he reports, a set of forty attitude questions in various formats was tested with two equivalent groups on two completely separate occasions. A chi-square comparison of each of the distributions obtained in the two measurements showed that there were no significant differences in response patterns in 39 out of 40 questions. Therefore, to ensure the reliability of the current instrument, great care was taken to meet such conditions in the designing and administering phases.

Validity, on the other hand, refers to the extent to which the instrument measures *what* it is expected to measure. The question then is how can we be sure that the used instrument really does measure what it sets out to measure? In principle, the answer to this question is not so very difficult *if* a criterion can be obtained. A criterion, claims Oppenheim (1966), is an independent measure of the same variable, to which the results of the current questionnaire can be compared. The concern in here, argues Oppenheim (1966) is that "many criteria that might be suggested are themselves unreliable and of doubtful validity... Moreover, in a great many instances criteria are not available – a 'true' answer simply does not exist" (p. 70). The chief difficulty in assessing the validity of attitude questions is the lack of criteria. Considering external behaviour as indicative of individuals' attitudes may suggest observing their behaviour as another criterion that helps establishing the validity of the attitude questions. The problem with endorsing such an assumption is highlighted by reviewing the non-linear and complex relationship between attitudes and behaviour (Chapter Three). Oppenheim (1966) sums it up saying, "[t]he links between attitudes and behaviour are complex ...We cannot necessarily predict behavior from attitudes; nor are

attitudes readily inferred from behavior with any validity, nor is behavior necessarily a more valid expression of an attitude than a verbal statement... At best, there will only be a rough correspondence between the two indicators" (p. 75-76).

The problems raised with establishing validity could be a reflection to the difference between factual and attitudinal measures. There is great difficulty of validating the latter simply because of their abstract, latent and indirect nature. Oppenheim (1966) points out that while "it remains difficult to be sure of reasonable validity even when we are dealing with factual questions,... when we deal with attitudinal questions the difficulties become almost insurmountable" (p. 72-73).

Validity, nonetheless, is thought of as much more important. It is possible to have a measure that is highly reliable yet of poor validity. Oppenheim (1966) gives an instance of a clock that is precisely eighteen minutes fast consistently. The degree of reliability, in this case, sets limits to the degree of validity possible. Validity cannot rise above a certain point if the measure is inconsistent to some degree. On the other hand, if a measure is found to have excellent validity, then it must also be reliable. Similarly, Reid (2006b) states, "[i]t is possible to have a reliably invalid test. An unreliable test will always be invalid" (p. 21).

Despite the fact that "the problem of validity remains one of the most difficult in social research" (Oppenheim, 1966, p. 78), there are some evidence of validity to be gained by considering the following: consulting groups of experts; seeking opinions of a group of those who know the population, the attitudes being considered or the social context and developing questions specific to the studied population. The latter could be achieved by, for example, developing questions based on previous discussions, questionnaires, by sample interviewing and by comparing any conclusions drawn from the measurement with other independent external observation. Having said that it is crucial to state that because beliefs and attitudes are not perfect predictors of behaviour, there is no absolute way to establish validity; however, "sensible checks can be made which can offer some encouragement" (Reid, 2006b, p. 11) like, for example, careful piloting of the questions, putting internal checks and comparing findings with other studies.

In establishing instrument validity, much of these procedures were considered. The following was conducted:

First, two experts considered the initial pool of 64 items. In doing that, the task of the experts was threefold. They were to match each pair of statements that form two ends of the attitude continuum (particular to the Osgood-type statements). They were to decide to which thinking position each statement belongs (i.e. 'Perry A', 'Perry B' or 'Perry C'). They were to exclude the statement with which they anticipate any problems. The first attempt at sifting the initial pool of questions ended up with 40 items; thus, excluding repeated questions, items that had elements of ambiguity and confusion, and items that any of the experts anticipated problems with. Second, these items were translated into Arabic. Third, both versions, the Arabic and the English were submitted to a panel of eight judges:

four Arabic and four Scottish graduate students studying for their doctoral and masters degrees. All were enrolled at the Glasgow University 2002/2003. They were consulted for Perry test construction and language. In light of their comments, further reduction in the number of items was recommended and minor language modifications were made.

Fourth, being aware of the likely time that could be made available, 27 questions were given priority for final selection. Fifth, this final draft was piloted as a pre-test. The pre-test process was conducted with graduate students studying in Scotland for a Post Graduate module part of a Master's degree. Ideally, subjects for pre-testing should be drawn from the research target population. However, considering that they, to a great extent, represented one of the three-targeted groups (i.e. post graduates) and because of practical limitations, this group was considered sufficient to participate in the pre-test assessment. Pre-testing was considered with great care as it was expected to operate as a healthy check, "since fatal ambiguities may lurk in the most unexpected quarters" (Oppenheim, 1966, p. 26). Indeed, the matter of total length and the amount of time and effort that can be requested from the average was considered at this stage. The major goal of the pre-test assessment was to make sure that items from the instrument could easily be read by those who were not aware of the theoretical background of the instrument. Readability was a major concern and so was time estimation. This is particularly important since a questionnaire that takes too long time to complete tends not to hold the attention of the research subjects throughout, resulting in poor test reliability. Results from the pre-test were satisfactory on all issues. It took the participants about 15-20 minutes to complete the whole questionnaire. Sixth, the final Arabic version was then translated back to English. An Egyptian interpreter who possesses good command of both languages was consulted in this process. Though respondents in this pilot study were small (14 students?), it is expected that some of the anticipated group differences would emerge. Pre-testing, therefore, was given greater scope and precision.

Finally, a consultation from the two experts approved of the 27-item-final version (see Appendices 6.1 and 6.2 for the English versions and Appendices 6.3 and 6.4 for the Arabic versions). Of those 27 items about 33% (9 items) were drawn from three previously developed instruments (Al-Shibli, 2003; Mackenzie, 1999; Selepeng, 2000). A teacher version was, then, created which mirrored the questionnaire used with student teachers yet with minor changes.

The selected items of the final draft of the instrument had been the outcome of careful sifting and pre-testing procedures; thus, ensuring the validity of the current instrument. However, some other "sensible checks" (Reid, 2006b, p. 11) were considered while administering the final draft to the target groups. Considering the "best safeguard" (Oppenheim, 1966, p. 72) is to have a good rapport with the respondents, great effort has been exerted to ensure respondents' honesty in responding. More details about this had been discussed earlier. Furthermore, there had been attempts to introduce internal logical checks for relative consistencies. Although, in constructing the instrument, each item was considered as an issue by itself, the interrelationships of the statements and their potential

reflection of one unit of beliefs or attitudes had made it possible to trace possible relative consistencies in the response patterns to quite related dimensions (i.e. the perception of the role of the teacher, and the role of the learner). Needless to say, many inconsistencies frequently exist side by side and can be defended. This certainly does not mean that the questions are unreliable (Oppenheim, 1966). The use of one 'Perry B' Likert statement was another attempt to achieve an internal check. The difficulty of writing pure 'Perry B' multiplicity thinking has been the concern of many researchers (Parker, 1984; Zhang, 1995). In the current instrument, an attempt has been made (Question 4 – Part II). The difficulty of the use of double-barrelled statements expressing this way of thinking was manifested in two aspects. The first is that respondents might agree with one part of the statement but not with the other. The second is that in interpreting the results, it would not be clear what a disagreement-score mean: does that mean 'Perry A' or 'Perry C' thinking? However, it is well worth mentioning here that the desire to have an agreement-score to the combination of the two statements outweighed these considerations. The distinguished pattern of responses, drawn from groups' responses to this question was further emphasis on the validity of the rest of the questions. It also ensures that response biases were not evident in the participants' responses. Nonetheless, caution should be taken in considering the results obtained from this type of questions.

In addition, respondents were given the opportunity in the questionnaire to add comments if they wished on any of the issues raised, the questionnaire's structure or other matters. These spaces were rarely used. The only exception was some students commenting on the 'Perry B' statement. This was anticipated beforehand. Moreover, talking to numerous respondents immediately after the questionnaire's administration provided further checks. Again, no major issues were identified by the respondents. All of this, while not guaranteeing validity, offers strong evidence that the respondents answered the questions in line with the intentions of their design.

To further validate the results obtained from this instrument the findings of the current study were compared with those of other studies. The assumption is that "if such an external check is corroborative we may justifiably feel that we are on the right track" (Oppenheim, 1966, p. 77). Indeed, aspects of consistencies with the findings of other studies (Al-Shibli, 2003; Selepeng, 2000; Zhang, 1999) were achieved. This will be further explained later (Chapters Seven, Eight and Nine).

Despite all efforts, it is important to acknowledge that validity is a problem "to which an adequate solution is not yet in sight" (Oppenheim, 1966, p. 78). The difficulties encountered with conducting research are, indeed, endless. A sample of these 'errors' are encapsulated in the following quote Oppenheim's (1966):

> All research is involved in the never-ending fight against error. Sometimes it is possible to compare observed differences between groups against "chance error" by means of statistical tests of significance, for instance, in designs in which respondent have been assigned to one of two or more groups at random. More often, however, our attempt at controlling variables have left a host of

> possible sources of error unaccounted for, such as: faults in the design of the survey; sampling errors; errors due to non-response; bias due to questionnaire-design and question wording; unreliability or lack of validity of various techniques used; varieties of interviewers bias; respondent unreliability, ignorance, misunderstanding; reticence, or bias; bias in recording and coding the responses; errors in processing and statistical analysis; faulty interpretation of the results. Great strides have been made in recent years in the improvement of sampling methods and the assessment of sampling-error limits, but the remaining sources of error are still very much with us. (p. 20-21)

While this is the case, it is satisfying to state that in the current instrument, great consideration had been given to address and minimise the effects of these potential errors where was possible. The ultimately aim was not to let their effect outweigh the gains of this study's findings.

6.4 Study Sample

Participants of phase one were drawn from two cultural contexts: Egypt and Scotland. Pre-service teachers (undergraduate and postgraduate student teachers) were chosen from two institutions: Women's College For Art, Science, and Education, Ain Shams University in Cairo, Egypt (where the researcher works as a lecturer) and The Faculty of Education, Glasgow University in Glasgow, Scotland (where the researcher is currently working for her degree).

Teachers from the Egyptian context were randomly selected to represent the teacher population. Different schools within different local authorities in Egypt were approached in an attempt to get representative sample. Ideally, the same was planned for selecting the teachers' sample in Scotland. Teachers attending PG masters modules at the Faculty of Education, Glasgow University were surveyed since they represented a range of different settings and contexts. In a study of this scale, approaching this group seemed convenient and practical. It has to be acknowledged, however, that the sampled teachers may not be true representative of the Scottish context. This is for two reasons: first, they had all chosen to undertake these PG modules and; therefore, it could be argued that they were more motivated and committed to change their practice than other teachers, and second they may have been influenced in their thinking by their attendance on the modules. A description of the numbers of the surveyed samples is presented in the following table (Table 6.2).

	Education College Years				Post Graduates	Teachers	Total Sample
	Year 1	Year 2	Year 3	Year 4			
Egypt	271	201	221	243	101	297	1335
Scotland	118	116	114	142	275	137	902

Table 6.2: The Distribution of all the Sampled Groups in the Egyptian and Scottish Contexts

A discussion of more demographic details about the surveyed sample is presented in the following tables to give an overall picture of the study sample. As to the Egyptian undergraduates, the sampled group is entirely of female students. This is basically because

Women's College For Art, Science, and Education is a higher education institution established exclusively to accommodate female students. As to the Scottish counterpart, the majority of participants are females reflecting the make-up of the profession (Table 6.3). The balance between both undergraduate groups is, therefore, accomplished.

	Undergraduate Students			
	BEd1	BEd2	BEd3	BEd4
Male	11	6	11	8
Female	106	107	101	130
Not Indicated	1	3	2	4
Total	118	116	114	142

Table 6.3: The Distribution of the Scottish Undergraduate Sample according to Gender and Year

The postgraduate students in the Egyptian context are students who already have a degree yet are interested in pursuing the profession of teaching. They study a one-year course of 'General Diploma in Education' that qualifies them to teach. The sampled students were enrolled in the same faculty 'Women's College for Arts, Science and Education'. In such a course, the faculty is legislated to accommodate both male and female students. Postgraduate students attend the lectures of the provided course irrespective of their sector. Though male students were approached, returns were from female students only. The Scottish equivalent of this degree is 'Postgraduate General Certificate of Education' known as PGCE. Demographic details of primary and secondary PGCE students are in table 6.4.

	Postgraduate Students		
	PGCE		Total
	Primary	Secondary	
Male	25	11	36
Female	210	16	226
Not Indicated	13	-	13
Total	248	27	275

Table 6.4: The Distribution of the Scottish Postgraduate Sample according to Gender and Degree

As shown in table 6.3 and 6.4, at least 80% of the sampled Scottish groups are female students. This close balance between the Egyptian and Scottish samples – in terms of gender – means that the samples were fairly well matched. It's worth noting; however, that neither gender not sector is used as a variable for sample selection. Gender is of interest mainly in the respect that Perry's work was conducted predominantly with men. It seems interesting, therefore, to apply his model to a predominantly female population.

6.5 Administration of the Instrument

The questionnaire was administered to participants who voluntarily agreed to take part in the study. The procedures concerning data collection were initiated after obtaining the ethical approval from Glasgow University.

In Egypt, data was collected from Women's College for Science, Art and Education. The head of the department was contacted with a letter from the researcher pointing out the aim of the study, the groups to be surveyed and the procedures required to be undertaken and

the names of colleagues who would be responsible for carrying out the task. Accompanying this was a letter obtained from Centre for Science Education. Permission was granted to go on with the planned procedures (see Appendix 6.5 and 6.6).

In Scotland, e-mails were sent out to each year's coordinator to set a suitable time to arrange access to the targeted groups where the researcher would have the chance of talking to the groups and ask the students to complete the questionnaire during class time and arrange for future returns if required.

In both educational systems (Egypt and Scotland), students of the same class level begin enrolment in their respective universities and are due to graduate at the same time. There are two semesters each year: the first from late September to January, the second from January through to June. Undergraduate and postgraduate participants had been in college for between four and five months when arrangements were made for the instrument to be administered.

The plan was to administer the instrument approximately at the same time in both faculties. In the Egyptian context, the goal was achieved and data was collected without much difficulty by the end of March. Similarly, this was the case for BEd1 and BEd2 in the Scottish context. Unfortunately, collecting data from the two other groups proved difficult. Because of low return rates, BEd3 and BEd4 groups have been approached so many times during that year in February, May and October. Exact matching of instrument administration timing proved impractical. It, therefore, was done when seemed possible and convenient.

In collecting data, group administration was used. Apart from the written explanation of this study, subjects received oral explanations from the researcher. Individual subjects received more oral explanation where needed.

As for teachers in both contexts, timing of instrument administration was not a major issue. They were approached throughout the semester. In the Egyptian context, through personal contacts, schools were approached with the ethics approval and a letter from the Centre of Science Education. Similar procedures were employed in approaching Scottish teachers in the Faculty of Education, Glasgow University. In both contexts, access was obtained without much difficulty.

It's worth noting, however, that a rigorous comparison is not the goal of this study. The intervening variables (of both cultures and educational systems, to name but few) are beyond any possible experimental control. Yet, what this study aims for is to identify the underpinning 'universal' human patterns of development that are conceptualised in Perry's model.

6.6 Statistics Procedures Employed in Data Analysis

Previously in this chapter the disadvantages of the Likert and Osgood's techniques were discussed. From this discussion, three of the most important points of criticism have been levelled against the use of both techniques as rating scales were identified. These relate to assumptions of unidimensionality, the assumed zero point and the assumed equality of intervals (Shaw & Wright, 1967). These assumptions have been criticised and considered as particularly flawed and insufficient when it comes to measuring attitudes and beliefs (Eagly & Chaiken, 1993; Oppenheim, 1966; Reid, 1978, 2006b; Shaw & Wright, 1967). This does not, however, mean that these scaling techniques must be rejected altogether but, rather, requires cautious their use through the identification and acknowledgement of their pitfalls and *perhaps* in addressing them (Oppenheim, 1966; Reid, 1978, 2006b). These issues will, therefore, be revisited briefly here to inform how the data collected using these techniques was statistically approached in the current study with the aim to minimise the raised problems.

Rating involves giving a numerical value to some kind of judgement. A familiar example of this is school marks (Oppenheim, 1966; Reid, 2006b). In a school test, there may be a number of questions. These questions are developed to cover different themes or skills. Each of them is awarded equal weight. Attempts are made to make these questions of similar demand so that a mark on one question would be worth something similar to a mark on another (Reid, 2006b). In doing that, it is possible to add up the total mark to obtain certain judgement as an objective assessment of an individual's performance. This of course depends on the aims of the course and how the questions offer coverage of these aims (Reid, 2006b).

Like achievement tests standardised tests for example intelligence tests and most other psychological tests are examples of the use of interval scales. Such scales not only use predetermined equal intervals, but also assume a zero point. This zero point is by no means an absolute true one, but an arbitrary one that may well allow for reproducibility (i.e. assuming equivalence of the differences at various parts of the scale). It is important to point out that, in most of the cases, the equality of intervals is defined in terms of the measuring instrument itself and not necessarily in terms of the ability to be measured. However, in practice – particularly with carefully constructed instruments – the intervals observed between scores on a test end up being treated as an approximation of ability intervals. A typical example of this viewpoint is quoted by Ary, Jacobs and Razavieh (1972) as such "the difference in ability between an IQ of 90 and an IQ of 95 may not be precisely the same as the difference between an IQ of 105 and an IQ of 110, but we will not be greatly misled if we assume that the two differences are approximately equal" (p. 94). In that respect, an assumption is made that all the questions of the instrument are measuring the same thing (i.e. measuring a latent construct) and that adding them together will provide greater accuracy (Reid, 2006b).

Rating, in psychology and education, is used for scoring responses on a scale. For example, 'strongly agree' could be assigned 5, 'agree' 4, 'neutral' 3, 'disagree' 2 and 'strongly disagree' 1. The problem with using numbers as such is embedded in the set of assumptions made about the equality of the intervals and the legitimacy of adding up the scores. These assumptions are difficult to sustain when it comes to measuring attitudes (Gardner, 1995; Oppenheim, 1966; Reid, 2006b).

When rated in this way attitudes tend to be perceived as straight lines, running from positive, through neutral to negative evaluations about the object or issue in question. Attempts at measurement, then, concentrate on trying to place a person's attitudes on the straight line or linear continuum, in such a way that s/he can be described as having, for example, mildly positive attitude or strongly negative one – preferably in terms of a numerical score. Having said that, it is important to state that, "[t]here is no proof, however, that this model of linear continuum is necessarily correct, though it does make things easier for measurement purposes. For all we know, attitudes may be shaped more like concentric circles or overlapping ellipses or three-dimensional cloud formation" (Oppenheim, 1966, p. 107).

Implicit in using the steps on a rating scale as if they had numerical values is the existence of a zero point at which attitudes can turn from 'strongly agree' to 'agree', from 'agree' to neutral'. Imposing cut-off points to provide an estimation of the proportion of respondents with, for example, a positive attitude is not justified as it crudely divide the sample into five or more groups according to their standing on the attitude continuum. The question, then, is what about those whose scores are placed on the borderlines of these cut-off points? Unlike interval scales, such a practice is simply invalid and illogical. It is therefore meaningless to say what proportion of the sample has positive attitudes in absolute terms. The appropriate approach may well be to focus on the relative differences by conducting comparisons among various groups. Oppenheim (1966) points that out saying:

> Attitude scales are relatively crude measuring instruments, and we must not expect too much from them. Their chief function is to divide people roughly into a number of broad groups, with regard to a particular attitude. Such scales cannot, by themselves, be expected to provide us with subtle insights in an individual case. They are techniques for placing people on a continuum in relation to one another, in relative and not in absolute terms. (p.121)

Implicit also is the assumption of interval equity. However, "we usually lack the evidence to justify such assumptions" (Oppenheim, 1966, p. 87). There is no support for imposing the qualities of a standardised test or an interval scale upon attitudes or beliefs. Such an assumption is basically flawed as there is no evidence to suggest that the qualitative differences or movement from position 1 to position 2 represents the same amount of development as moving from position 2 to position 3. The distance between positions one and two may be very large but between two and three may be minute. Indeed, the size of the intervals is unknown and unlikely to be equal.

As been explained before, the scales of an attitude instrument correlating with each other or with the total score does not necessarily guarantee the unidimensionality of the instrument. It might indicate internal consistency, but that does not necessarily mean that the instrument is valid or reliable (Gardner, 1995; Oppenheim, 1966; Reid, 2006b).Moreover, while with an achievement test, evidence of pupils' skills and understandings might be gained by using a range of topics, an attitude scale might similarly explores numerous aspects of individuals' attitudes (Reid, 2006b). However, 'adding up' such things cannot give any meaningful outcome. There are, nonetheless, frequent cases where this is uncritically done (Reid, 2006b). Looking at the current instrument, an example would provide an illustration. In exploring participants' beliefs about the nature of ability or intelligence, various questions were asked to explore issues about intelligence being:

- general ability 'G' *or* as multiple intelligences 'MI',
- a genetically fixed endowment *or* an environmental built up and enhanced one,
- an equivalent to academic success and IQ test scores *or* exceed this to mean life success and
- a gift that only ideal teachers can label on whoever they think fits its parameters *or* a process that both teachers and students are engaged in developing or even creating.

In fact, the procedure of adding up scores of such issues produces a fairly meaningless number (Oppenheim, 1966; Reid, 2006b). This is because these questions ask *different* things. Moreover, this procedure assumes that these traits are unitary and ignores them being complex entities. This is particularly emphasised by considering that attitudes are almost multidimensional. Unidimensionality of scales is, hence, considered a problem (Gardner, 1995; Oppenheim, 1966; Reid, 2006b). Therefore, the requirement of 'reproducibility' as a principle of attitude measurement would, in practice, be difficult to achieve, because many attitude scales would "not amenable to this kind of cumulative or progressive scaling – partly because they may not be unidimensional" (Oppenheim, 1966, p. 123).

Furthermore, as been discussed before, numerically identical attitude-scale scores may indeed represent very different psychological and attitudinal profiles. This simply indicate how meaningless it is to make judgements based on such figures without paying enough attention to the details and patterns that make up these scores. By using attitude scales in this way important details will almost inevitably be lost (Oppenheim, 1966; Reid, 2006b). Gross trends and factors, nonetheless, may well still be apparent (Reid, 1978, 2003, 2006b).

Reid (2006b) provides an interesting example that illustrates the folly of this inattention. If an insight into an individual's health and fitness is of interest,

> we book into a clinic where all kinds of measurements are made: blood pressure; temperature; heart rate; heart rate when exercising; height; weight; cholesterol level; subcutaneous fat level, and so on. We come away with a printout of all these measurements. It would be folly to add the data on our print out! We cannot add weight to blood pressure to heart rate and so on. The

> 'sum' would be utterly meaningless... Nonetheless, the literature is replete with examples of this kind of careless analysis. (p. 14)

Although the total score may have little meaning in itself, it would be helpful when used to identify extreme values of the population for further investigations (Fam, 1999; Reid, 2006b). Other than that, to add marks from separate questions, there should be some evidence that these marks are "on a *comparable scale*, measure *something meaningful*, and giving a total which carries *some clear meaning*. In attitude work, this is rarely possible" (Reid, 2006b, p. 14).

To conclude, the problems with scaling techniques is summed up by (Reid, 2006b, p. 14) as follows:

- There is no way of ensuring that steps on the scale are equally spaced. It is impossible to measure the spacing.
- Values on one question may not be comparable to those on another. Almost certainly they are not and there is no way of knowing the relative values.
- They often assume normality which is frequently absent. Indeed, large skewing may be 'desirable' and polarisation may often be observed.
- Correlations do not necessarily imply direct relationship.
- Similar scores may be obtained for very different patterns of attitudes.
- The data obtained from questionnaire items are 'soft' in the sense that, for an individual, error limits are high. Any 'score' obtained for an individual will, therefore, be open to considerable error, even though the number of questions is very large.
- Combining scores hides the rich details arising from each question. The distribution in each separate question is what matters.

Having explored the pitfalls that might be associated with the uncritical use of scaling techniques in the measurement of attitudes, it would be possible to conclude that "[t]he use of ratings invites the gravest dangers and possible errors, and in untutored hands the procedure is useless. Worse, it has a spurious air of accuracy, which misleads the uninitiated into regarding the results as hard data" (Oppenheim, 1966, p. 84).

This means that, in practice, two principles should be considered in dealing with soft data obtained from attitude and belief measurements. If considered, the scaling techniques of Likert and Osgood's tend to perform very well as reliable, rough ordering of people with regard to a particular attitude (Oppenheim, 1966). The first is that equal score intervals do not permit us to make assertions about equality of underlying attitude differences as there are no justifications in basing the calculations on such an assumption either within each

scale or among different scales. The second is that identical scores may, indeed, have very different meanings.

Therefore, in the current instrument, both techniques are used as ordinal scales. The data obtained from using them is considered as soft and categorical data. In doing so, no assumptions are made about the spacing of the intervals. Moreover, adding the responses in the questions to give a total score was considered as inappropriate. Instead, each item was individually analysed. However, being aware that attitudes are by nature complex and that too much depends on the actual form and wording of the question, no inferences were made on participants' responses from the analysis of just a single attitude question. Hence, a set of individually analysed four or five questions (essentially designed to measure different aspects of an attitude concept) was "qualitatively added" (Reid, 2006b, p. 18) to reach a final judgement about the attitude in question. This way of treating the data would allow for unmasking important and rich group variances. Losing these details affects the accuracy with which issues of concern can be investigated or diagnosed. Indeed, as Reid puts it (2006b)" [a]ttitude scaling should not be used for logical and statistical reasons. It must be recognised that such an approach will only show gross trends simply because the rich detail is lost in the adding process and precision is lost because the method relies on the application of scale methodologies to categorical data and the use of inappropriate statistics" (p. 20). The only disadvantage of using such an approach lies mainly in the amount of details a researcher could be faced with. If the researcher is not quite clear about what exactly s/he is looking for, it would be quite easy to get lost being unable to make any sense of them. It would actually be interesting to analyse data using both approaches: one the violate the equality of intervals and the assume unidimensionality just to pick up the gross trends in the sampled groups and the other to give that extra look at the rich details and patterns existing among groups to provide more accuracy and precision.

As to the statistical treatment of the data, it is well worth stressing that participants' attitudes were not measured in an absolute or certain sense. Reid (2006b) argues that "[t]his simply cannot be done with attitudes. In the present state of knowledge, *attitudes cannot be measured in any absolute sense*, with any degree of certainty. However, responses to attitude measures can be *compared*: before and after some experience, between two different groups such as male and female" (p. 11). The responses of each group were evaluated in terms of how they are relatively compared to the remaining groups. In such a case what is of major importance is the interesting patterns emerging across the various targeted groups. The differences among groups were, indeed, more important than the absolute figures. In the current study, it is "the patterns of development", observed among the different groups, that have been the focus of interest.

There are indeed four reasons that underpin the choice of this particular phrase 'pattern of development'. First, it is a phrase that has been frequently used in referring to Perry's scheme. Second, it has been also quoted when discussing other subsequent models of intellectual development. Third, in the current study, it is used more specifically to reflect the overall picture emerging from observing how change took place within each year group

and over the years across the six studied groups. Fourth, it adequately expresses the view that the focus of attention in data analysis is more on the emergent trends not the absolute figures. For all of the above reasons, this phrase is used to examine participants' responses in Egypt and Scotland and to compare them with the pattern of development discerned from Perry's scheme of ethical and intellectual development.

Having explored how data obtained from Likert and Osgood's scaling techniques are dealt with in the current study, attention will now be drawn to determining the statistical technique used in comparing the differences among the examined groups. The use of this statistical test of significance would make it possible to compare observed differences among groups against "chance error".

SPSS was used to analyse the data obtained from the questionnaire. Kinnear & Gray (2000) and Pallant (2001) were consulted in guiding technique choice and correct SPSS usage. In deciding which statistical technique should be used to explore the differences between the various sampled groups, three criteria were examined: the scale of measurement, the normality of distribution in the surveyed population, and the number of the studied sample.

The categorical variables and the polarised distribution of the sample on most of the questionnaire's issues would suggest the use of a non-parametric statistical technique. Parametric statistics are, nonetheless, more powerful. However, they make stringent assumptions about the data and assume that the underlying distribution of scores in the population (from which the study sample is drawn) as normal. In social science research, this is not a common situation and this is particularly true in the case of this study. Nonetheless, replete in the literature are examples of studies that treat categorical soft data like interval data the same way as in standardised tests (Reid, 2006b). Psychologists give means and standard deviations specified for a certain population and these are used to check if the experimental sample deviated from 'the norm' of such a population. This is seriously questioned when measuring attitudes.

Despite that, some statisticians argue that most of the parametric approaches are fairly 'robust'; that is, they will tolerate minor violations of assumption, particularly if the sample size is large (Cone & Foster, 1993). Though the sampled numbers of this phase are quite large, non-parametrical statistics are used. This is in attempt to avoid any serious violation that might invalidate the findings. Though non-parametrical statistics tend to be not as powerful, that is they may be less sensitive in detecting a relationship or a difference among groups, they are used in this study.

Taking into account these issues, in the current study, it is decided that data are analysed using the non-parametrical statistical technique of chi-square (χ^2). On using this particular statistical technique to compare groups' differences, Reid (2006b) points out that, "the huge advantage of this statistic is that it does not assume any distribution and, provided care is taken in its use, it will indicate whether differences in two distributions of responses

on a small scale (like five or six points) are likely to have happened by chance or are statistically significantly different" (p. 18). Though this is basically a quantitative approach, general patterns of responses are interpreted qualitatively. Although qualitative and quantitative perspectives represent distinct methodological approaches and have differentiating characteristics, their merging is both possible and indeed desirable (Ponterotto & Grieger, 1999). Both approaches are used in this study.

6.7 Elaborations on Data Presentation

In the following two chapters, each of the 27 items of the questionnaire will be discussed in turn. Data is presented in percentages and whole numbers (for the nearest integer) for clarity. All statistical analysis is carried out on raw data.

The patterns of responses of the various groups were compared using chi-square statistics in the following manner: Chi square as 'Goodness of Fit' statistics was used where students groups in year 2, year 3, and year 4 of their university study years were compared with students in Year 1. Students in their first year were regarded as the control group. All other statistical comparisons used chi-square as a 'Contingency Test' (see appendix 6.7 for details).

In this questionnaire, Johnstone's conceptualisations are used. He classified Perry's nine positions into three categories A, B and C (Chapter Five). The questionnaire developed for this study aimed to explore the differences between students' and teachers' Perry positions. Though – when administered – the items of the questionnaire are presented in a random order, for clarity of presentation, items that deal with the same 'dimension' are grouped together. Examples of the method used to allocate their positions from the responses are discussed hereafter.

The first example comes from the first part of the questionnaire that is based on using Osgood's method. In this part of the questionnaire, there are 18 questions in total. Question 9 (Table 6.5) is used as an example of how data was presented.

'Perry A' Statement	A	A	B	B	C	C	'Perry C' Statement
The best way to pass my courses, I believe is to study just what the lecturer tells me.	1	2	3	4	5	6	I don't have to rely totally on the lecturer. Part of my learning is to work things out myself.
	⇦		S1	S2		⇨	

Table 6.5: An Example of How the Osgood Statements of the Questionnaire are Structured

In this example, the 'Perry C' statement is at the right side of the questionnaire and the 'Perry A' statement is on the left side. In this case, the first two boxes from the right represent 'Perry C' position whereas the first two on the left represent 'Perry A' position. The two other middle boxes represent 'Perry B' position. The closer the box is ticked towards any statement whether 'Perry A statement' (S1) or 'Perry C statement' (S2), the stronger the respondent believes in it. This means that those who tick Perry C5 box believe in 'Perry C statement' (S2), yet not as strongly as those of who tick Perry C6 box. Similarly

for those who tick Perry B4, though they are still positioned as 'Multiplicity Perry B' thinking, their beliefs are more towards 'Perry C statement' (S2) than those who tick Perry B3. Their beliefs are more towards 'Perry A statement' (S1). The same logic applies to the questions of the reverse direction. Such moves among the various compared groups are interestingly traced and discussed in the following two chapters yet after discussing another example.

In the second part of the questionnaire, the Likert method was used. In the next example (Table 6.6), the statement in this question expresses a 'Perry C' view. If the respondent went with 'strongly agree' or 'agree', this would suggest a 'Perry C' thinking. While the choice of either 'strongly disagree' or 'disagree' represents 'Perry A', going for 'not sure' would represent 'Perry B' thinking.

'Perry C' Statement	C	C	B	A	A
The views of my peers could sometimes sound more important, critical and worth some thought than those of the lecturer or those in the textbooks.	5	4	3	2	1

Table 6.6: An Example of How the Likert Statements of the Questionnaire are Structured

After entering the data into a spreadsheet, the percentages of the respondents of each group for each question are presented using SPSS. The following table (Table 6.7) represents how data is presented in the following chapter.

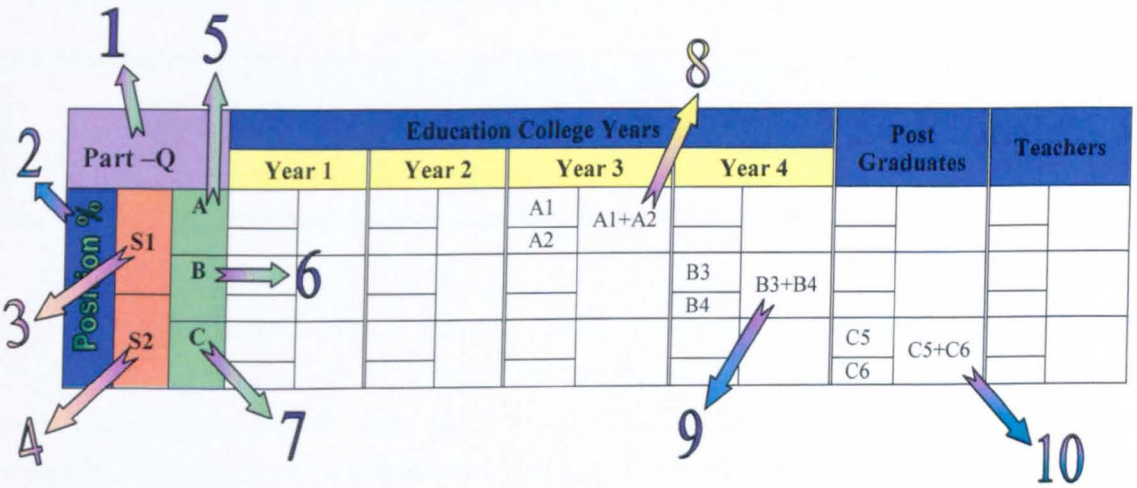


Table 6.7: An Example of How Data is Presented in the Experiment

The *Numbers Key* of this table is presented as follows:

1	Question Number	6	'Perry B' thinking positions
2	Data presented in percentages	7	'Perry C' thinking positions
3	First Statement ('Perry A' view)	8	The total sum of 'Perry A' two positions
4	Second Statement ('Perry C' view)	9	The total sum of 'Perry B' two positions
5	'Perry A' thinking positions	10	The total sum of 'Perry C' two positions

The results of the used statistical techniques are presented in the following table:

Part X–Q X	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square										
Degree of freedom										
Significance level										

In conducting the comparisons, every group is coded with a certain number to simplify data presentation. Year 1 students are, therefore, referred to as "1", Year 2 as "2", year 3 as "3", and similarly year 4 as "4". The postgraduate group is referred to as "5" and teacher groups as "6".

The following two chapters present the gathered data and discuss its interpretation in the Egyptian and Scottish contexts respectively.

Chapter Seven

Data Analysis of the Egyptian Sample: Phase One

7.1 Introduction

In this chapter, the data gathered from the Egyptian sample are summarised and discussed. This includes the six dimensions of the questionnaire as identified in chapter five: perceptions of the nature of ability, perceptions of the nature of knowledge, perceptions of the role of peers, perceptions of assessment, perceptions of the role of the learner, and perception of the role of the teacher.

Questions related to each dimension are individually analysed and then collectively brought together and summarised. In such a summary, when applicable some issues that show interesting or inconsistent patterns are discussed before ultimately drawing more general conclusions at the end. For each question, a table is presented showing the percentages of the surveyed six groups of pre- and in-service teachers at Perry's different thinking positions (A, B, or C). Percentages are used for clarity but all statistical calculations were carried out using raw data. The patterns of responses of the various groups are compared using chi-square ($\chi 2$).

The sample sizes and group number for the Egyptian data are shown in table 7.1.

	Educational College Years				Post graduates	Teachers
	Year 1	Year 2	Year 3	Year 4		
Samples (N)	271	201	221	243	101	297
Group Number	1	2	3	4	5	6

Table 7.1: Egyptian Sample Sizes

Perry's pursuit to understand students' intellectual and ethical development is deduced from their perceptions of their learning environment. Therefore, when it is stated that participants have beliefs that are congruent with relativistic 'Perry C' thinking, this indicates that they are 'intellectually developed', have 'positive perceptions of teaching and learning', or have 'positive educational beliefs'. For simplicity, "Perry C thinking" is the phrase used here to express all of the above terms.

It is worth noting that in conducting statistical analysis, the beliefs of the undergraduate groups throughout their BEd degree were compared to the beliefs held by undergraduates in their first year. The entering undergraduate group was treated as the control group against which change is traced. Postgraduates' beliefs were compared to those held by undergraduates in the first and final year of their degree. The beliefs of the teachers group were compared with the undergraduates groups in their first and final year as well as with the postgraduates group. It is; therefore, important to bear in mind that when the phrase 'compared to other groups' is mentioned, this indicates these specified comparisons.

7.2 Beliefs about the Nature of Ability

Part I Question 3

A	If you are intelligent, you will be able to do many things well.
C	Intelligence means different things. This means that you can be good at one thing and bad at another.

Part I – Q 3			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	20	38	11	26	28	40	12	27	19	26	35	46
			18		15		12		15		7		11	
		B	6	11	7	14	3	12	5	19	1	8	9	23
			5		7		9		14		7		14	
	S2	C	22	52	28	60	16	47	25	55	21	66	11	32
			30		32		31		30		45		21	

Part I – Q 3	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	15	15	26	14	118	77	44	16	51	36
Degree of freedom	5	4	4	4	5	5	5	4	5	4
Significance level	0.01	0.005	0.001	0.01	0.001	0.001	0.001	0.005	0.001	0.001

The majority of undergraduates hold 'Perry C' beliefs. A significant increase in 'Perry B and C' thinking is noticed during their degree years except in year 3 where there is an increase in 'Perry A' thinking revealing polarisation of beliefs between 'Perry A and C' positions. As beliefs change, students – in years 2 and 4 – opt to go for less extreme positions of (B4 and/or C5). Responses tend to fluctuate throughout the degree. While postgraduates are the most intellectually developed group as two thirds hold 'Perry C' thinking, teachers are the least developed forming the highest 'Perry A and B' thinking. Unlike undergraduates, postgraduates opt to choose strong positions (C6).

Part I Question 8

C	Intelligence is something like a muscle that can – given the right circumstances – develop or shrink.
A	Intelligence is something genetic that you're born with. You can learn new things but you can't change it.

Part I – Q 8			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	32	47	24	42	16	28	12	27	15	26	21	33
			15		18		12		15		11		12	
		B	8	14	7	15	7	16	8	13	8	16	9	19
			6		9		9		5		8		10	
	S2	C	11	39	16	43	17	56	18	60	14	58	22	49
			28		27		39		42		44		27	

Part I – Q 8	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	12	38	54	21	47	22	10	3	20	11
Degree of freedom	5	5	5	5	5	5	5	5	5	5
Significance level	0.05	0.001	0.001	0.001	0.001	0.001	N.S.	N.S.	0.005	N.S.

The majority of undergraduates start their degree with 'Perry A' thinking. There is, however, a significant development of 'Perry C' thinking throughout their degree years to reach its highest in year 4. Over half of postgraduates hold 'Perry C' thinking mirroring the pattern of undergraduates in year 4. Nearly half of the teachers group have 'Perry C' beliefs, they – compared to undergraduates in year 4 and postgraduates – form the lowest percentage of 'Perry C' thinking and the highest 'Perry A and B' thinking.

Part I Question 18

A	Intelligent students have high IQ and do well at university.
C	Intelligence is not limited to IQ scores or to academic success.

Part I – Q 18			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	8	17	7	16	5	11	3	8	5	11	17	26
			9		9		6		5		6		9	
		B	7	15	6	19	6	17	5	20	3	14	11	26
			8		13		11		15		11		15	
	S2	C	21	69	19	65	26	72	25	72	11	75	18	49
			48		46		47		47		64		31	

Part I – Q 18	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	8	9	28	13	75	9	7	2	39	36
Degree of freedom	5	5	4	4	5	5	5	2	4	4
Significance level	N.S.	N.S.	0.001	0.02	0.001	N.S.	N.S.	N.S.	0.001	0.001

The majority of undergraduates hold 'Perry C' congruent beliefs. Throughout their degree, no significant change is noticed except in year 4 where there is a decrease in 'Perry A' thinking for an increase in 'Perry B and C'. Year 4 students, also, go for less radical positions of (B4 and C5). Intellectual development is highest with postgraduates who show a pattern that is not significantly different from that of undergraduates in their final year. However, they opt to go for the radical position of (C6). Though nearly half of the teachers group hold 'Perry C' thinking, they – in comparison to other groups – show a significant increase in 'Perry A and B' thinking.

Part II Question 1

A	The ideal lecturer can tell who is able and who is not.

Part II – Q 1			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	17	53	14	44	15	51	23	68	26	68	37	76
			36		30		36		45		42		39	
		B	12		16		19		8		13		9	
		C	23	35	23	41	19	30	19	24	18	20	11	16
			12		18		11		5		2		5	

Part II – Q 1	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	12	11	27	13	104	10	40	3	15	5
Degree of freedom	4	4	4	3	4	4	4	3	4	3
Significance level	0.02	0.05	0.001	0.01	0.001	0.05	0.001	N.S.	0.005	N.S.

Across all groups, the majority of their population – at varying percentages – hold 'Perry A' congruent beliefs. Throughout the BEd degree, an undulation of responses is noticed. Despite the initial significant development noticed in year 2, resurgence to 'Perry A' thinking is noticed by the time students reach year 3. In the final year of their degree, students form the least intellectually developed group. Postgraduates seem to mirror year 4 undergraduates' pattern of responses where the majority of students are in 'Perry A' positions. Teachers reveal more congruence with dualistic thinking as they form the highest 'Perry A' thinking percentage of all groups.

Bringing it together

In education, the term ability does often cognate with the term 'intelligence'. Pre- and in-service teachers' beliefs about ability are investigated in terms of 'intelligence' being perceived as either

- a general ability 'G' *or* as multiple intelligences 'MI' (Part I - Q 3),
- a genetically fixed endowment *or* an environmental built up and enhanced one (Part I - Q 8),
- an equivalent to academic success and IQ test scores *or* exceed this to mean life success (Part I - Q 18) and
- a gift that only ideal teachers can label on whoever they think fits its parameters *or* a process that both teachers and students are engaged in developing or even creating (Part II - Q 1).

Their beliefs about the nature of ability are now summarised:

From groups' responses to Part I questions, it is clear that

- the majority of undergraduates start their degree with 'Perry C' thinking in two (I-3, I-18) of the three issues.
- the majority of undergraduates end the degree with 'Perry C' thinking on all Part I discussed issues (I-3, I-8, I-18).
- undergraduates' beliefs about ability tend to develop along their study years manifested in the increase of 'Perry C' and/or 'Perry B' thinking.
- development does not take a steady linear pattern. Undergraduates in year 3 (I-3) manifest an example of that by their significant regression to 'Perry A' thinking.
- during development – in some issues (I-3, I-18) – students opt to choose less strong positions.
- the majority of postgraduates predominantly reveal 'Perry C' thinking. Compared to other groups, it is significantly the highest in (I-3).
- postgraduates' beliefs mirror those of undergraduates in year 4 in two issues (I-8, I-18).
- postgraduates opt to go for the strong position of (C6) as noticed in (I-3, I-18).
- nearly half of the teachers group hold 'Perry A' thinking in (I-3). Though the majority in (I-8, I-18) have 'Perry C' beliefs about ability, they reveal the highest 'Perry A and B' percentages in comparison to other groups.

From groups' responses to Part II question, it is noted that

- in contrast to the responses to Part I questions, there is a consistency of results observed across all groups in Part II where beliefs are mostly congruent with 'Perry A' thinking. Two possible reasons may explain this. First, in the phraseology of this item the word 'intelligence' – with its connotations – is not included, the responses, therefore, might be a spontaneous expression of how they perceive ability rather than how it should be perceived. Second, the question may be tapping into another issue that is linked with their views on the nature of what a teacher is and what he/she can do.

7.3 Beliefs about the Nature of Knowledge

Part I Question 2

A	All one has to do in studying is to memorize things paying great attention to the details.
C	Instead of just memorizing things, it is more interesting to look for patterns and relationships among information and facts, searching for the big idea behind it all.

Part I – Q 2			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	12	21	11	22	10	18	10	20	14	18	13	20
			9		11		8		10		4		7	
		B	3	6	4	10	8	18	5	19	5	11	13	22
			3		6		10		14		6		9	
	S2	C	15	74	22	69	18	64	20	62	19	71	23	58
			58		47		46		42		53		35	

Part I – Q 2	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	16	70	89	6	186	25	7	6	17	12
Degree of freedom	4	4	4	2	4	4	5	4	5	4
Significance level	0.005	0.001	0.001	N.S.	0.001	0.001	N.S.	N.S.	0.005	0.02

The majority of undergraduates start and end their BEd degree holding 'Perry C' beliefs. However, throughout their degree course, they show a significant decline in 'Perry C' thinking to reach the lowest percentage in year 4. In addition, a concomitant increase in 'Perry B' thinking is noticed. Through the BEd degree, students opt to go for less extreme positions (B4, C5). Postgraduates hold 'Perry C' thinking – mirroring undergraduates in years 1 and 4. The majority of teachers hold 'Perry C' beliefs. Nevertheless, compared to other groups, it is the lowest. They significantly form the highest 'Perry B' thinking.

Part I Question 6

C	Knowledge is complex and by no means all black and white. I find this exciting and stimulating. It makes me want to explore things more for myself.
A	Knowledge is a collection of facts that are right or wrong, black or white. I dislike uncertainties and vague statements.

Part I – Q 6			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	26	41	23	41	18	32	23	39	32	44	18	26
			15		18		14		16		12		8	
		B	8	14	10	19	7	18	8	17	9	14	8	22
			6		9		11		9		5		14	
	S2	C	19	45	21	41	28	50	21	44	16	43	16	53
			26		20		22		23		27		37	

Part I – Q 6	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	8	23	5	3	64	14	9	6	23	17
Degree of freedom	5	5	5	5	5	5	5	5	5	5
Significance level	N.S.	0.001	N.S.	N.S.	0.001	0.02	N.S.	N.S.	0.001	0.005

The majority of undergraduates start and end their degree with 'Perry C' beliefs. A polarised division of beliefs between 'Perry A and C' positions is noticed through most of their degree with no significant changes happening except for a significant development in 'Perry C' thinking in year 3. Developing students still opt to go for less extreme positions (B4, C5). This development is lost by the time they finish their degree. Postgraduates mirror the polarised pattern observed with undergraduates in years 1 and 4. Teachers show the lowest 'Perry A' and the highest 'Perry C' thinking of all groups.

Part I Question 14

C	I don't believe that all we learn represents the 'absolute truth'; students should try to understand arguments for and against the existing knowledge.
A	What we learn outlines a set of explanations about what is happening in the world. Students need to confine themselves to absorbing this information.

Part I – Q 14			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	5	10	5	11	6	10	2	6	2	4	6	11
			5		6		4		4		2		5	
		B	7	15	4	16	4	14	3	10	4	10	6	16
			9		13		10		8		6		10	
	S2	C	25	75	28	74	26	76	32	84	22	86	25	74
			49		46		50		52		64		49	

Part I – Q 14	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	5	0.1	16	11	0.5	2	11	0.4	9	9
Degree of freedom	3	5	3	3	5	3	3	2	2	4
Significance level	N.S.	N.S.	0.005	0.02	N.S.	N.S.	0.01	N.S.	0.01	N.S.

The majority of undergraduates hold beliefs congruent with 'Perry C' thinking all through their BEd degree. There is no significant change happening till their final year when there is a significant increase in 'Perry C' thinking. Students – in year 4 – are the most intellectually developed of all undergraduate groups. They, however, opt to go for less extreme position (C5). Similarly, the majority of the postgraduates and teachers group hold beliefs congruent with 'Perry C' thinking. Compared to undergraduates in year 4, while postgraduates opt to go for the radical position of (C6), teachers' 'Perry C' population is significantly less.

Part II Question 7

A	The information the lecturer gives or that is in the textbooks is far more important than any class activities which require thinking about what we already know or what we have learned.

Part II – Q 7			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	10	28	6	24	4	18	4	21	1	9	13	31
			18		18		14		17		8		18	
		B	16		15		19		14		19		21	
		C	37	55	43	62	46	64	48	65	49	72	34	48
			18		19		18		17		23		14	

Part II – Q 7	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	5	14	12	19	11	6	5	8	15.9	23
Degree of freedom	4	3	3	3	4	3	3	3	3	3
Significance level	N.S.	0.005	0.01	0.001	0.02	N.S.	N.S.	0.05	0.005	0.001

Initially, over half of undergraduates start their BEd degree with beliefs congruent with 'Perry C' thinking. Through their degree years, there is a consistent development in 'Perry C' thinking. However, these developing students opt for less extreme positions (B4, C5). The percentage of postgraduates holding 'Perry C' beliefs is significantly the highest of all groups. Unlike other groups, teachers form the highest percentages of 'Perry A' and 'Perry B' thinking and the lowest 'Perry C' thinkers of all. Nevertheless, nearly half of them hold 'Perry C' congruent beliefs.

Part II Question 8

A	In learning I don't like to encounter information which contradicts what I already know. I find that confusing.

Part II – Q 8			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	29/32	60	23/31	54	22/39	61	24/39	63	27/38	64	13/33	46
		B	12		18		14		14		16		12	
		C	19/6	27	22/6	28	18/7	25	18/3	21	16/8	24	29/6	34

Part II – Q 8	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	11	9	12	2	58	9	2	1	21	18
Degree of freedom	4	4	3	4	4	4	3	3	3	4
Significance level	0.05	N.S.	0.01	N.S.	0.001	N.S.	N.S.	N.S.	0.001	0.005

The majority of all groups noticeably hold beliefs congruent with 'Perry A' thinking. Despite a potential development in year 2 (as a greater number of students opt for 'Perry B' thinking), this does not develop any further. More students, by the end of their degree, hold 'Perry A' congruent beliefs than at the start. However, they choose less extreme positions (A2). Postgraduates' pattern of development mirrors that of undergraduates in year 1 and year 4. The majority of teachers hold 'Perry A' beliefs. They, however, form the lowest 'Perry A' and the highest 'Perry C' thinking percentage compared to all groups.

Bringing it together

Pre- and in-service teachers' perceptions of the nature of knowledge are investigated in terms of 'knowledge' being perceived in learning as either

- discrete, disconnected and is to be memorised, focusing in learning on details ***or*** branched, interconnected and organised in relationships, focusing in learning on patterns and big ideas (Part I - Q 2).
- facts that are right or wrong and black or white ***or*** complex, uncertain and by no means all black or white (Part I – Q 6).
- certain representing the absolute truth that should be absorbed ***or*** representing explanations that have arguments for and against with which students should be engaged (Part I – Q 14).
- important if provided by external authority like the lecturer or textbooks ***or*** drawing its importance from being internally generated (Part II – Q 7).
- fitting with what is already in the existing schemata (in which case learning is enjoyable) ***or*** contradicting what is already known (in which case learning is not enjoyable and confusing) (Part II – Q 8).

Their beliefs about the nature of knowledge are summarised as follows:

From groups' responses to Part I and II questions, it is clear that

- undergraduates start and end their degree with the majority at 'Perry C' positions in four issues (I-2, I-6, I-14, II-7).
- undergraduates' beliefs show no polarisation for the issues that included words like 'study' and 'learn' in its phraseology. In (I-2, I-14, II-7), at least more than half of them have 'Perry C' congruent beliefs.

- undergraduates reveal different patterns of belief change over the years either ultimate decline by the end of the degree (I-2, II-8), constant development (II-7), or no significant development except in one year (I-6, I-14).
- development, therefore, does not take a consistent linear pattern.
- the decline noticed in (I-2, II-8) may be explained by assessment colouring their view of knowledge. In exam driven learning environment, feelings of pressure and threat may influence students' perceptions to rely more on memorisation and on minimising any possible challenging information that does not fit with what is already there.
- students' responses to (I-14) show strong congruency with 'Perry C' (as at least nearly three quarters of their population are in 'Perry C' positions) than that of (I-6). This may be explained by students' strive for engagement and accountability in the process of learning. Their consistent development in valuing the internal construction of knowledge (II-7) seems to emphasise that explanation.
- in changing students – in all issues – opt to choose less strong positions.
- postgraduates reveal the highest 'Perry C' thinking in three issues (I-2, I-14, II-7). Of which their responses to (II-7) are significantly different.
- postgraduates' beliefs mirror those of undergraduates in year 1 and/or 4 in (I-2, I-6, I-14, II-8).
- compared to undergraduates in year 4, they in (I-14) opt for the extreme position of (C6).
- the majority of teachers hold 'Perry C' beliefs about the nature of knowledge in most issues (I-2, I-6, I-14, II-7).
- compared to other groups, they either hold the highest 'Perry C' percentages (I-6, II-8) or revert back to 'Perry A and B' (I-2, II-7).
- despite the general development teacher manifest in their beliefs about knowledge, the reversion noticed in the latter two issues might be a reflection of the dichotomy between what they wish things to be and the reality of the system in which they operate.

7.4 Beliefs about the Role of Peers

Part I Question 15

A	I don't like it when students disagree. Disagreement means no one understands what is being discussed.
C	I like it when students disagree. I understand more as a result of these discussions.

Part I – Q 15			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	3	6	2	6	1	4	1	4	2	2	9	13
			3		4		3		3		0		4	
		B	7	13	4	9	4	17	5	16	2	15	9	20
			6		5		13		12		13		11	
	S2	C	11	82	18	86	14	79	18	80	17	83	17	67
			71		68		65		62		66		50	

Part II – Q 15	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	12.	28	32	18	104	19	4	2	27	24
Degree of freedom	4	4	4	3	4	2	3	3	3	3
Significance level	0.02	0.001	0.001	0.001	0.001	0.001	N.S.	N.S.	0.001	0.001

Across all groups, the majority of the population at varying degrees hold beliefs that are in agreement with 'Perry C' thinking. Despite initial development in year 2, undergraduates' 'Perry C' beliefs tend to slightly yet significantly decline towards the end of the degree with a significant concomitant increase in 'Perry B' thinking. They, nevertheless, end their degree still with 'Perry C' congruent beliefs opting for less strong positions still (B4, C5). Postgraduates mirror the responses of undergraduates in their final year. The majority of teachers are in congruence with 'Perry C' thinking. They, however, form the highest percentages of 'Perry A' and 'Perry B' thinking compared to all other groups.

Part II Question 4

B	I find working in groups a good opportunity to discuss things with my peers and to listen to their viewpoints. However, I consider the final word of the lecturer to be much more important.

Part II – Q 4			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	B	53	86	41	77	39	76	44	89	46	83	20	60
			33		36		37		45		38		40	
			7		13		18		5		10		20	
			5	8	9	10	5	6	5	6	6	7	17	21
			3		1		1		1		1		3	

Part II – Q 4	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	19	54	17	3.3	210	8	28	3	67	32
Degree of freedom	3	3	3	3	3	3	3	3	3	3
Significance level	0.001	0.001	0.001	N.S.	0.001	0.05	0.001	N.S.	0.001	0.001

In this question, an attempt to form a 'Perry B' statement is made. Though it proved difficult to analyse, the thought was worth a trial. The majority of each groups' population indicate a preference for 'Perry B' thinking. For undergraduate, however, there is a significant decrease in 'Perry B' population noticed in year 2 and 3. Throughout the years, students choose the less extreme position. Postgraduates mirror the developmental pattern of undergraduates in years 1 and 4. Teachers, however, form the lowest 'Perry B' thinkers.

Part II Question 6

C	My peers and I can be just as reliable a source of assessment as the teachers.

Part II – Q 6			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	3 / 14	17	2 / 16	18	4 / 14	18	2 / 12	14	8 / 13	21	5 / 11	16
		B	22		23		22		22		22		20	
		C	42 / 19	61	49 / 11	60	44 / 17	60	48 / 16	64	48 / 9	57	43 / 22	65

Part II – Q 6	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	5	1	4	7	94	8	3	4	83	70
Degree of freedom	3	3	3	3	3	3	3	3	3	4
Significance level	N.S	N.S.	N.S.	N.S.	0.001	0.05	N.S.	N.S.	0.001	0.001

Beliefs tend to be in congruence with 'Perry C' thinking as the majority of all groups' populations are in 'Perry C' positions. There is little change happening throughout the BEd degree. Postgraduates' pattern of responses does not significantly differ from that of undergraduates in years 1 and 4. Teachers, however, show the highest percentage of 'Perry C' thinking of all groups with the highest percentage (22%) of all groups opting for the more extreme position of C6.

Part II Question 9

C	The views of my peers could sometimes sound more important, critical and worth some thought than those of the lecturer or those in the textbooks.

Part II – Q 9			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	7 / 23	30	6 / 15	21	3 / 14	17	3 / 15	18	7 / 21	28	8 / 7	15
		B	21		20		31		26		25		15	
		C	31 / 18	49	36 / 24	59	32 / 20	52	44 / 13	57	29 / 18	47	39 / 32	71

Part II – Q 9	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	10	22	30	1	76	18	18	9	29	26
Degree of freedom	4	3	3	4	4	3	3	3	3	4
Significance level	0.05	0.001	0.001	N.S.	0.001	0.001	0.001	0.05	0.001	0.001

Undergraduates start their BEd degree with beliefs congruent with 'Perry C' thinking. Throughout their degree course, there is a consistent decline in 'Perry A' thinking as students significantly move to 'Perry B' and 'Perry C' positions. Postgraduates' beliefs show a pattern of development similar to that of undergraduates in year 1. Teachers' beliefs are also in congruent with 'Perry C' thinking. However, they form the highest 'Perry C' and the lowest 'Perry A and B' thinking percentages of all groups.

Bringing it together

Pre- and in-service teachers' perceptions of the role of peers are explored in terms of

- appreciating peer discussion and considering disagreement amongst their views as an opportunity for learning and not a waste of class time (Part II – Q 15).
- considering working in groups as a good learning opportunity, yet when it comes to studying, the final word of the lecturer is what counts. Peers can never live up to lecturers' level of reliability (Part II – 4).
- regarding peers as a reliable valid source of assessment: traditionally considered teachers' responsibility (Part II – Q 6).
- perceiving peers' views as worthy of consideration sometimes more than those of the teacher or those in the textbooks (Part II – Q 9).

The analysis of pre- and in-service teachers' beliefs about the role of peers is summarised as follows:

From groups' responses to Part I and II questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking in three of the four issues (I-15, II-6, II-9).
- development does not take a consistent linear pattern, different patterns are noticed for the different issues. While undergraduates' beliefs reveal no significant change throughout the years in (II-6), they significantly develop in other (II-9). Slight decrease in 'Perry C' and significant increase in 'Perry B' is noticed in (I-15). Throughout the years their beliefs are congruent with 'Perry B' in (II-4).
- the decline noticed in (I-15, II-4) might be linked to students' notion of 'how to pass exams'.
- in their change throughout the years, undergraduates in (I-15, II-4) opt to go for the less extreme positions.
- in all issues (I-15, II-4, II-6, II-9), postgraduates' beliefs mirror those of undergraduates in year 1 and/or 4.
- unlike the usual pattern noticed in their responses, postgraduates in (II-6, II-9) form the least 'Perry C' compared to other groups. This might relates to the nature of their degree, which puts great emphasis on the individual and his/her contributions rather than on the group.
- on most issues (I-15, II-6, II-9), the teachers group hold 'Perry C' congruent beliefs. They in (II-6, II-9) significantly represent the highest percentage of 'Perry C' thinking. It is worth noting, however, that teachers' stand towards the role of peers in learning is different from that of students. They, therefore, may be inclined to reflect idealism in their responses.
- reversion in teachers' responses is noticed only in (I-15). This is possibly related to the nature of classroom learning environment in which common to teachers' concern are issues of discipline and maintaining control.

7.5 Beliefs about the Nature of Assessment

Part I Question 1

A	In exams, my job is to give back the information provided on the course as accurately as possible.
C	In exams, my job is to answer the questions using information I have been taught as well as information I have gained for myself.

Part I – Q 1			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	28	35	18	26	15	24	20	26	17	20	9	13
			7		8		9		6		3		4	
		B	2	5	3	5	3	11	5	9	7	9	3	7
			3		3		8		4		2		3	
	S2	C	15	61	17	69	16	65	15	65	17	72	25	81
			46		52		49		50		55		56	

Part I – Q 1	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	9	40	19	4	72	17	8	2	23	4
Degree of freedom	4	4	4	1	4	4	4	4	4	2
Significance level	0.05	0.001	0.001	0.05	0.001	0.005	N.S.	N.S.	0.001	N.S.

The majority of undergraduates' beliefs are congruent with 'Perry C' thinking. Throughout their BEd degree, there is a decrease in 'Perry A' thinking for an increase in 'Perry B and C' thinking. Postgraduates mirror the pattern of development of undergraduates in year 4 where most of the population have 'Perry C' beliefs. Teachers' beliefs are congruent with 'Perry C' thinking. They form the least percentages of 'Perry A' and 'Perry B' responses compared to all other groups.

Part I Question 4

A	I prefer questions which require short answers and are based on the course.
C	I find short answer questions restrictive, as they don't give me the opportunity to go beyond what is taught and show my ability to think.

Part I – Q 4			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	23	35	20	30	17	31	19	31	33	38	32	46
			12		10		14		12		5		14	
		B	7	13	7	17	10	20	4	18	5	14	14	21
			6		10		10		14		9		7	
	S2	C	12	52	15	53	14	49	18	52	12	48	13	33
			40		38		35		34		36		21	

Part I – Q 4	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	11	156	42	11	56	9	1	12	38	17
Degree of freedom	4	5	5	5	5	5	2	4	5	5
Significance level	N.S.	0.01	0.001	0.05	0.001	N.S.	N.S.	0.02	0.001	0.005

Initially, undergraduates start their BEd degree with more than half of them in 'Perry C' positions. Throughout their BEd degree, students' beliefs show only small changes. However, there is a consistent increase in 'Perry B' thinking compared to year 1. Throughout the years, students select the less strong positions of (C5 and B4). Postgraduates' beliefs are divided between 'Perry C' and A' thinking with the majority in 'Perry C' position. They are significantly less than undergraduates in years 1 and 4. The majority of teachers, however, have 'Perry A' congruent beliefs. They form the highest percentage of 'Perry A' and B' thinking and the least 'Perry C' thinking of all groups.

Part I Question 7

C	To me being assessed is not a real threat. It is an opportunity for feedback and improvement of learning and teaching.
A	Feedback is not of much importance as getting high grades if not the best grades. It is the most important aspect of my assessment.

Part I – Q 7			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	16	25	19	30	14	30	16	28	12	20	8	13
			9		11		16		12		8		5	
	S2	B	6	16	11	19	13	28	16	27	9	26	6	17
			10		8		15		11		17		11	
		C	19	59	26	51	21	42	23	45	21	53	13	70
			40		25		21		22		32		57	

Part I – Q 7	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	26	60	64	10	44	25	7	9	74	18
Degree of freedom	5	5	5	5	5	5	5	5	5	5
Significance level	0.001	0.001	0.001	N.S.	0.001	0.001	N.S.	N.S.	0.001	0.005

Though over half of students start their degree with 'Perry C' thinking positions, through the years there is a consistent decrease in that population. All through their BEd years, students seem significantly to drift away from 'Perry C' thinking towards 'Perry A' and 'Perry B' positions. They, again, opt to choose the less strong positions. Postgraduates show a developmental pattern that is insignificantly different from undergraduates in years 1 and 4. Teachers' group have the least percentages of 'Perry A and B' thinkers of all groups. Their beliefs form the highest percentage in agreement with 'Perry C' thinking of all groups.

Part I Question 12

C	I believe in exams what matters is the quality of my answers, not how much information I provide.
A	In exams, I expect to be rewarded for giving as much information as possible.

Part I – Q 12			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	13	20	17	25	14	21	11	20	12	22	21	30
			7		8		7		9		10		9	
		B	3	9	7	14	4	13	5	11	4	9	5	14
	S2		6		7		9		6		5		9	
		C	17	71	22	62	17	67	15	69	11	69	18	56
			54		40		50		54		58		38	

Part I – Q 12	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	18	5	6	4	41	9	4	2	19	15
Degree of freedom	4	4	4	4	4	4	4	5	5	5
Significance level	0.005	N.S.	N.S.	N.S.	0.001	N.S.	N.S.	N.S.	0.005	0.02

Initially, the majority of undergraduates have 'Perry C' congruent beliefs. Their beliefs seem not to change significantly throughout their degree except for the significant decline noticed in year 2 when students drift back to 'Perry A' and 'Perry B' thinking. Postgraduates' beliefs show a pattern of development similar to that of undergraduates in years 1 and 4. Though over half of the teachers group are in 'Perry C' position, they form the least percentage of 'Perry C' and the highest 'Perry A and B' thinking compared to other groups.

Part II Question 2

A	When I start a new course, the most important aspect is knowing the assessment procedures.

Part II – Q 2			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	24 / 48	72	23 / 39	63	17 / 39	56	14 / 48	62	12 / 41	53	20 / 41	61
		B	13		18		26		18		13		13	
		C	12 / 4	16	13 / 7	20	17 / 2	19	16 / 4	20	33 / 1	34	21 / 5	26

Part II – Q 2	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	11	39	19	29	27	12	10	8	8	5
Degree of freedom	4	3	3	3	4	3	3	3	3	3
Significance level	0.02	0.001	0.001	0.001	0.001	0.01	0.02	0.05	N.S.	N.S.

The beliefs of the majority of each groups' population are strongly dominated by 'Perry A' thinking. Throughout their BEd degree, an oscillation in undergraduates' responses is noticed. Through their degree years, students significantly move from 'Perry A' to 'Perry B and C' thinking. Above half of postgraduates are 'Perry A' thinkers. They, nevertheless, form the highest 'Perry C' percentage of all groups. Teachers' pattern of responses does not differ from that of undergraduates in year 4 or postgraduates where the majority are 'Perry A' thinkers.

Bringing it together

Perceptions of the nature of assessment of pre- and in-service teachers are currently probed in terms of exams being either

- limited to regurgitating information studied on course ***or*** exceeds that in order to include information personally gained all through (Part I – Q 1).
- preferred in the form of restrictive short questions based on the course ***or*** in a form that gives the chance to express students' views and thoughts (Part I – Q 4).
- perceived competitively as a chance to get high (if not the highest) grade ***or*** as an opportunity for feedback that informs and improves learning and teaching (Part I – Q 7).
- a matter of the quantity of the answers provided ***or*** a matter in which the quality of students' answers count as more important (Part I – Q 12).
- the most important aspect to know about when approaching any new learning experience ***or*** being of importance but what counts more is the journey of learning rather than the outcome (Part II – Q 2).

Pre- and in-service teachers' beliefs about the nature of assessment summed up as follows:

From groups' responses to Part I and II questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking in four of the five issues (I-1, I-4, I-7, I-12).
- undergraduates' beliefs about the nature of assessment tend to develop along their study years manifested in the increase of 'Perry C' and/or 'Perry B' thinking. Development does not take place in a steady linear pattern, though.

- various patterns of development are noticed. While development is noticed in undergraduates' responses to (I-1, I-4, II-2), consistent decline is noticed in (I-7). Undergraduates' beliefs in (I-12) seem ultimately to undergo no change.
- the decline noticed in (I-7) is explained by undergraduates' response to (II-2) where the majority hold 'Perry A' beliefs which in essence reflects the pressure of exams caused by formal assessment driven system.
- those developing students – in issues (I-4, I-7, I-12) – opt to choose the less extreme positions.
- the majority of postgraduates hold 'Perry C' thinking (I-1, I-4, I-7, I-12).
- postgraduates' beliefs insignificantly differ from those of undergraduates in years 1 and/or 4 in three issues (I-1, I-7, I-12).
- though postgraduates' responses to (II-2) is predominantly from 'Perry A' perspective, they form the least 'Perry A' and the highest 'Perry C' thinking compared to other groups. This may be explained by the fact that they had successfully been through a degree that seems to provide them with a sense of confidence and safety.
- teachers hold 'Perry C' beliefs about assessment in three issues (I-1, I-7, I-12). Compared to other groups, they, significantly, form the highest percentage of 'Perry C' thinking on the first two and the lowest 'Perry C' thinking on the latter issue. It is important in interpreting teachers' responses to bear in mind that teachers' responses are from an assessor's perspective which is different from that of students.
- the pattern of regression noticed in (I-12) seems inconsistent with teachers' 'Perry A' dominated response in (I-4). Whereas in the former teachers seem to agree more on rewarding students for the quantity of their answers, in the latter they seem to prefer questions that are short, based on the course and do not give students the opportunity to go beyond that showing their ability to think. At first glace, these responses might seem contradictory. Yet, a closer look reveals the dilemmas and the complexities of teachers' world. On one hand, 'being rewarded on providing much information' reflects an approach that has for so long been adopted and reinforced by the system in which they operate and is deeply engrained in teachers' mindset. On the other hand, the work overload required for such an approach – with huge class numbers common in the Egyptian schools – might be the reason behind them going for short answers that are restrictive in nature. Going for assessment as the driving force and the main agenda behind learning any new material simply emphasises this (II-2).

7.6 Beliefs about the Role of the Learner

Part I Question 9

A	The best way to pass my courses, I believe is to study just what the lecturer tells me.
C	I don't have to rely totally on the lecturer. Part of my learning is to work things out myself.

Part I – Q 9			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	8	14	10	16	8	15	8	19	9	14	13	21
			6		6		8		10		5		7	
		B	4	11	4	14	6	18	6	19	1	9	8	19
			7		10		12		13		8		11	
	S2	C	19	75	25	71	25	66	22	63	19	77	20	61
			56		46		41		41		58		41	

Part I – Q 9	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	10	23	30	1	38	8	4	12	6	11
Degree of freedom	4	5	5	4	5	3	5	4	5	4
Significance level	0.05	0.001	0.001	N.S.	0.001	0.05.	N.S.	0.02	N.S.	0.05

The majority of undergraduates have Perry 'C' congruent beliefs. Throughout their degree, there is a consistent decline in 'Perry C' thinking to reach its lowest percentage in year 4. Postgraduates represent the highest 'Perry C' and the least 'Perry B' thinking compared to other groups. They insignificantly differ from undergraduates in year 1. Teachers, however, are significantly the least 'Perry C' and the highest in 'Perry A' thinking positions. Their pattern of responses is more like undergraduates in year 4.

Part I Question 10

C	Students should take some responsibility and have a say in deciding what to learn, how to learn and how to be assessed.
A	Lecturers are experts in their subjects. If things at times look confusing, it is so because they want us to think for ourselves.

Part I – Q 10			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	12	25	14	26	9	21	9	23	8	22	14	25
			13		13		12		14		14		10	
		B	5	11	3	9	6	13	5	12	5	11	5	17
			7		7		7		7		6		11	
	S2	C	17	64	19	65	24	66	25	65	18	68	14	59
			47		46		42		40		50		44	

Part I – Q 10	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	2	12	15	2	13	11	2	3	16	7
Degree of freedom	4	5	5	5	5	4	5	5	5	5
Significance level	N.S.	0.05	0.02	N.S.	0.02	0.02	N.S.	N.S.	0.01	N.S.

The majority of undergraduates have 'Perry C' congruent beliefs. Throughout the years, there seems to be a minimum decease in 'Perry A' thinking for a slight increase in 'Perry B and C' thinking. These changes are statistically significant, though. In developing, students over the years opt to move for the less strong position of (C5). Postgraduates mirror the developmental pattern of undergraduates in years 1 and 4. They, however, represent the highest percentage of 'Perry C' thinking. The least 'Perry C' thinkers are in the teachers group. Though above half of the teachers group is in 'Perry C' thinking, they form higher 'Perry A and B' thinking percentages compared to other groups.

Part I Question 13

C	Students should be given the chance to pursue their own interests in class.
A	If students are given the chance to pursue their interests in the class, we might end up not learning enough of the course.

Part I – Q 13			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	12	23	11	17	11	21	5	12	13	25	7	11
			11		6		10		7		12		4	
		B	6	15	7	13	6	15	6	13	7	13	2	12
			9		6		9		7		6		10	
	S2	C	16	62	28	72	18	65	23	75	19	63	20	77
			46		44		47		52		44		57	

Part I – Q 13	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	26	1	24	2	39	19	15	9	4	15
Degree of freedom	5	5	5	5	3	5	5	5	4	4
Significance level	0.001	N.S.	0.001	N.S.	0.001	0.005	0.02	N.S.	N.S.	0.005

The majority of undergraduates hold 'Perry C' congruent beliefs. In years 2 and 4 of the BEd degree, there is a consistent increase in 'Perry C' thinking and consistent decrease in 'Perry A' and 'Perry B' thinking. The changes in year 3 are not statistically significant, nevertheless. Nearly two thirds of the postgraduates group are in 'Perry C' thinking. Their pattern of development is not significantly different from undergraduates in years 1 and 4. Interestingly, teachers are the group in most agreement with 'Perry C' thinking and the least 'Perry A' and 'Perry B' thinkers of all groups.

Part I Question 16

A	I can't be wrong if I accept what the lecturer says. If I question anything I might end up failing.
C	I don't believe in just accepting what the lecturer says without question. Success involves thinking for myself.

Part I – Q 16			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	11	18	8	14	6	14	4	11	4	11	16	24
			7		6		8		7		7		8	
		B	10	21	15	30	5	24	9	25	10	24	14	30
			11		15		19		16		14		16	
	S2	C	28	61	29	57	30	61	33	65	28	65	21	46
			33		28		31		32		37		25	

Part I – Q 16	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	11	26	15	6	26	20	11	1	24	13
Degree of freedom	5	5	4	5	5	5	4	4	4	5
Significance level	N.S.	0.001	0.005	N.S.	0.001	0.005	0.05	N.S.	0.001	0.02

The majority of undergraduates are in 'Perry C' thinking positions. In the last two years of their BEd degree, there is a slight decrease in the population of 'Perry A' thinking and an increase in 'Perry B and C' thinking. These changes are statistically significant, nevertheless. Postgraduates again show a pattern of responses that is not significantly different from undergraduates in years 1 and 4. Teachers, yet again, significantly represent the lowest percentage of 'Perry C' thinking and the highest 'Perry A and B' thinking of all groups.

Part I Question 17

A	I don't like vague assignment where the lecturer does not specify exactly what is required from you and how to get it done.
C	I enjoy undertaking tasks where the lecturer does not specify exactly what to be done and it is left to me to decide.

Part I – Q 17			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	27	44	32	54	28	48	30	50	33	43	34	51
			17		22		20		20		10		17	
		B	11	20	12	16	16	26	7	20	10	19	10	22
	S2		9		4		10		13		9		12	
		C	15	36	12	31	13	26	15	31	16	37	15	28
			21		19		13		16		21		13	

Part I – Q 17	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	10	14	14	4	19	26	18	9	5	8
Degree of freedom	3	5	5	5	5	5	5	5	5	5
Significance level	0.02	0.02	0.02	N.S.	0.005	0.001	0.005	N.S.	N.S.	N.S.

Initially, the majority of undergraduates start their BEd degree with 'Perry A' thinking. Throughout the years, there is a significant increase in 'Perry A' thinking and a concomitant decrease in 'Perry C' thinking. The majority of postgraduates hold 'Perry A' beliefs. Their responses are not significantly different from that of undergraduates in years 1 and 4. Teachers' beliefs are even more congruent with 'Perry A' thinking. They, however, show a developmental pattern that is not significantly different from that of postgraduates.

Bringing it together

Pre- and in-service teachers' beliefs of the learner's role are examined in terms of students either

- being dependent in learning on what the lecturers says (for the sake of passing exams) ***or*** becoming independent in learning working things out for themselves (Part I – Q 9).
- having a voice in learning and sharing decisions about what to learn, how to learn and how to be assessed ***or*** giving up all the responsibility to teachers even if at times when things seem confusing, students are reluctant to question teachers expertise and authority (Part I – Q10).
- considered as reliable individuals whose interests in learning should be acknowledged and pursued ***or*** limiting learning to information in the textbooks as the only source to learn enough of the course (Part I- Q 13).
- having a critical disposition towards what is learned believing that success involves thinking for themselves ***or*** accepting what the lecturer says believing that questioning that would result in failure (Part I- Q 16).
- being uncomfortable with responsibility: if given an assignment, they would want the lecturer to designate what is to be done and the procedures required to get it done ***or*** being comfortable with such responsibility and any risk undertaking it might involve (Part I- Q 17).

The analysis of pre- and in-service teachers' beliefs about the role of the learner can be summarised as follows:

From groups' responses to Part I questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking in four of the five issues (I-9, I-10, I-13, I-16).
- various patterns of development are noticed. While development is noticed in undergraduates' responses to (I-10, I-13, I-16), consistent decline is noticed in (I-9, I-17).
- the common thing about the issues in which students develop (I-10, I-13, I-16) is students' striving for voice and individuality in the process of learning.
- undergraduates' 'Perry A' dominant responses in (I-17) seems consistent with the decline noticed in (I-9). By the end of their degree, students seem to accentuate the authoritative role of the lecturer by relying more on what the teacher tells them and on the structured environment he/she provides. This might be linked to students desire to get high grades and pass exams.
- both patterns may seem contradictory. Yet, in essence, they reflect the 'reality vs. aspiration' complex. Taking this into account, it seems that students' strive for voice and individuality in learning is the key step for motivating, engaging, and developing independent, critical and responsible learners.
- while developing, students – in issue (I-16) – opt to choose less strong positions.
- postgraduates' beliefs are mostly from 'Perry C' perspective and seem to mirror those of undergraduates in year 1 and/or 4 in all issues.
- in four of the five issues (I-9, I-10, I-13, I-16), teachers hold 'Perry C' views.
- reversion to 'Perry A and B' thinking is noticed in three issues (I-9, I-10, I-16). Moreover, in (I-17) teachers significantly form the highest 'Perry A' thinking of all groups. This observed pattern raises a concern of being a reflection of how teachers really prefer students to be (passive recipients) or of being a reality reinforced by the way schools work.
- teachers' response in (I-13) reveal a pattern that deviates the rest of the issues as they significantly form the highest 'Perry C' thinking. This may well be teachers reflecting idealism than reality.

7.7 Beliefs about The Role of the Teacher

Part I Question 5

C	I think a good lecturer should point out some of the conflicting views on an issue. Students should be given the opportunity to weigh them up.
A	A good lecturer is the one who points out to students the one accepted view on an issue or at least his preferred one.

Part I – Q 5			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	7	13	6	10	6	10	7	14	5	11	9	13
			6		4		4		7		6		4	
		B	2	6	2	11	4	12	2	10	0	5	9	21
			4		9		8		8		5		12	
	S2	C	15	82	21	80	18	78	21	77	15	84	13	66
			67		59		60		56		69		53	

Part I – Q 5	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	16	17	17	1	124	2	7	6	19	15
Degree of freedom	3	4	4	3	4	3	4	4	4	2
Significance level	0.001	0.005	0.005	N.S.	0.001	N.S.	N.S.	N.S.	0.001	0.001

The majority of undergraduates have 'Perry C' congruent beliefs. Throughout their degree years, there is a significant decrease in 'Perry C' thinking for an increase in 'Perry B' thinking. Postgraduates represent the highest percentage of 'Perry C' thinking. Nevertheless, compared to undergraduates in years 1 and 4, this difference is not statistically significant. Though two thirds of the teachers group are in 'Perry C' positions, this is the lowest percentage compared to other groups. They, moreover, significantly form the highest 'Perry B' thinking.

Part I Question 11

A	I think a good lecturer should avoid teaching materials that they know students will find difficult.
C	Lecturer should aim at providing challenges to their students by introducing difficult topics.

Part I – Q 11			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	20	30	20	29	11	19	13	21	9	13	18	26
			10		9		8		8		4		8	
		B	6	16	5	21	10	25	9	23	10	25	6	23
			10		16		15		14		15		17	
	S2	C	20	54	27	50	22	55	31	56	27	63	28	52
			34		23		33		25		36		24	

Part I – Q 11	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	19	19	34	16	32	32	15	6	6	11
Degree of freedom	5	5	5	4	5	5	5	4	5	4
Significance level	0.005	0.005	0.001	0.005	0.001	0.001	0.02	N.S.	N.S.	0.02

The majority of undergraduates hold 'Perry C' congruent beliefs. Throughout the years, a significant decline in 'Perry A' thinking is noticed for a significant increase in 'Perry B' thinking. Postgraduates, again, show the least 'Perry A' thinking and the highest 'Perry C' thinking of all groups. Over half of the teachers group are in 'Perry C' thinking. Postgraduates and teachers' pattern of development is insignificantly different from that of undergraduates in year 4.

Part II Question 3

C	Perplexing as it may sometimes appear, I find my lecturers different points of view very interesting and stimulating.

Part II – Q 3			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	7 / 12	19	3 / 14	17	3 / 7	10	3 / 16	19	2 / 11	13	3 / 16	19
		B	16		19		19		14		14		13	
		C	31 / 34	65	44 / 21	65	47 / 25	72	46 / 21	67	43 / 30	73	46 / 22	68

Part II – Q 3	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	21	33	30	10	34	9	25	4	0.1	3
Degree of freedom	3	3	3	3	3	3	3	3	3	3
Significance level	0.001	0.001	0.001	N.S.	0.001	0.05	0.001	N.S.	N.S.	N.S.

The majority of undergraduates are in 'Perry C' thinking positions. Throughout the degree, there is an increase in 'Perry C' thinking that reaches its highest in year 3. In such development, students opt to choose the less extreme position of (C5). Postgraduates show the highest 'Perry C' population compared to other groups. Their responses are not significantly different from that of undergraduates in years 1 and 4. Teachers' pattern of development does not significantly differ from that of postgraduates or undergraduates in the final year where most of the teacher population have 'Perry C' congruent beliefs.

Part II Question 5

A	If lecturers would stick to the information and the facts they are teaching and do less theorizing, one could get more out of their classes.

Part II – Q 5			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	23 / 26	49	21 / 29	50	23 / 25	48	21 / 27	48	17 / 26	43	21 / 31	52
		B	17		15		18		17		9		26	
		C	23 / 11	34	23 / 11	34	27 / 8	35	27 / 8	35	40 / 8	48	17 / 6	23

Part II – Q 5	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	2	3	5	19	28	6	1	7	12	27
Degree of freedom	4	4	4	4	4	4	4	4	4	4
Significance level	N.S.	N.S.	N.S.	0.001	0.001	N.S.	N.S.	N.S.	0.02	0.001

Nearly half of undergraduates' initial responses show congruence with 'Perry A' thinking. Throughout their degree, this remains intact, as there seem to be no significant changes happening. Postgraduates are almost equally divided between 'Perry A' and 'Perry C' thinking positions. Though the majority of them are in agreement with Perry 'C' thinking, their pattern of development does not significantly differ from that of undergraduates in their final year. Teachers' beliefs represent the least 'Perry C' thinking. They represent the highest 'Perry A and B' thinking percentages compared to other groups.

Bringing it together

Pre- and in- service teachers' beliefs about the teacher's role is examined in terms of teachers should either

- provide students with various conflicting views on an issue and give them the chance to argue for what they believe in ***or*** point out the one accepted view or at least his preferred view (Part I – Q 5).
- be challenging providing students with learning experiences that they know might be perceived as difficult ***or*** avoiding this for fearing students' perceptions of its difficulty (Part I – Q 11).
- have different views amongst themselves (authorities can disagree with each other and that is stimulating) ***or*** conceal that (if that is the case) for fearing of creating perplexity among students (Part II – Q 3).
- theorise about what they teach which is perceived as useful ***or*** should stick to the information and facts within the textbook. This helps getting more out of the classes (Part II – Q 5).

Pre- and in-service teachers' beliefs about the role of the teacher can be summed up as follows:

From groups' responses to Part I and II questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking in three of the four issues (I-5, I-11, II-3).
- development does not take a steady linear pattern as various patterns are observed. While undergraduates' beliefs develop throughout the years in (I-11, II-3), they regress in (I-5) and remain intact with no significant change in (II-5).
- the pattern of regression observed in (I-5) is in harmony with the developmental pattern noticed in undergraduates' beliefs about the role of the learner discussed earlier. By the end of their degree, students' tend to prefer the lecturer taking the lead pointing out the one accepted view or at least his preferred one. Moreover, this consistency is accentuated by students pattern of responses in issues (I-17, II-8) where undergraduates – towards the end of their degree – tend to prefer less cognitive conflicts, and less inclination to deal with ambiguity. They, yet again, confirm this by significantly adopting less strong positions in their responses to perceiving differences among authority (II-3). Indeed, the pressure of passing exams might be the reason behind this common pattern.
- similar consistency of responses is observed between undergraduates' responses to (I-11) and students responses on the issues that seems to stress their proactive role in the process of learning (I-10, I-13).
- the majority of postgraduates are predominantly in 'Perry C' thinking positions.
- postgraduates' beliefs seem to mirror those of undergraduates in year 1 and/or 4 in all issues.
- the teachers group hold 'Perry C' beliefs about their role in three issues (I-5, I-11, II-3). Nevertheless, compared to other groups, they reveal beliefs that are in less congruence with 'Perry C' thinking and more with 'Perry A and/or B' thinking (I-5, I-11, II-5). These patterns are consistent with their perceptions of the role of the learner discussed earlier.

7.8 Conclusion

In this section, general conclusions from the data are now summarised. In doing so, it is important to emphasise that what is of interest in this investigation is tracing general trends and patterns of beliefs change.

Undergraduates

According to Perry's model, students start their university degree with dualistic 'Perry A' beliefs. This is not supported by the Egyptian data where students, in almost 74% (20 items) of the questionnaire's issues start their degree with positive beliefs and perceptions in agreement with 'Perry C' thinking. Undergraduates hold 'Perry A' and 'Perry B' thinking in only in 26% ('Perry A' 6 items and 'Perry B' 1 item) of the questionnaire's issues.

Perry found that, towards the end of their degree, students hold beliefs that are relativistic and in accord with 'Perry C' thinking. This is confirmed here, with 'Perry C' beliefs being indicated in almost 78% (21 items) of the questionnaire's issues. However, of all the questionnaire's issues, significant development in 'Perry C' thinking is noticed in 52% (14 items) where students ended up their degree with more holding 'Perry C' thinking or less 'Perry B' or 'Perry A' than when they started. Retreat or no significant change is noticed in almost 48% (13 items: 10 'retreat' and 3 'no change') of the questionnaire's items.

Perry noticed that the pattern of development progresses linearly and hierarchically from 'Perry A' to 'Perry B', ending with 'Perry C' thinking: the climax of development, students reach in their final year. The observed pattern of development of the Egyptian students is not completely consistent with this. Three observations are noticed. First, a clear-cut trend of linear development from 'Perry A', to 'Perry B' and ultimately 'Perry C' beliefs is not noticed, as students' views frequently appear to oscillate. Second, by the end of the degree, students' beliefs on many issues; remained in 'Perry A' and 'Perry B' beliefs (nearly 22% – 6 items), remained intact (nearly 11% – 3 items), or significantly retreated to 'Perry A' and/or 'Perry B' (37% – 10 items). Third, albeit that there was observed development in some issues (about 37% of BEd 4 'Perry C' Responses), the pattern that emerged was that students opt significantly and consistently for less strong positions in expressing their perceptions (about 70% of the questionnaire's issues).

Perry also assumed that this pattern of development is a general tendency of development that is maintained across all dimensions. This hypothesis is not supported by the data. Different patterns of 'development' and/or 'regression' and/or 'no significant change' are frequently identified across a range of dimensions. It can, therefore, be concluded that the cognitive developmental pattern described by Perry is not identified in Egyptian undergraduate students.

Postgraduates

Having been through a degree themselves, postgraduates are hypothesised to be holding 'Perry C' beliefs. As been discerned from the previous data analysis, this hypothesis is strongly supported as postgraduates – in almost 74% (20 items) of the questionnaire's items – responded with 'Perry C' congruent beliefs.

Since postgraduates' route into teaching (via one-year PG Diploma) is different from that of undergraduates (via four-year Faculty of Education Degree), a key question was of interest: 'Does this different route into teaching result in a different belief framework being held as they enter the teaching profession?' In fact, postgraduates' beliefs seem not to differ significantly from undergraduates' beliefs in their final year – in almost 78% (21 items) of the questionnaire's issues. However, compared to other groups, it was interesting to note that they frequently formed the highest 'Perry C' and/or the least 'Perry A' population in many issues across all dimensions with the exception of their perceptions of the role of peers. Moreover, they – unlike undergraduates in year 4 – revealed a strong degree of confidence as they markedly opted for the extreme positions (C6 or C5) in most cases (41% of the questionnaire's issues – around 11 items). It is worth noting that in 56% (15 items) of the questionnaire's issues, their responses were not significantly different from undergraduates in their first year.

Teachers

According to Perry's conceptualisations, teachers are expected to be in a 'Committed to Relativism' position. Considering the hierarchical nature of development in Perry's model, this position transcends and subsumes relativism. Therefore, they are expected – when compared with all other groups – to hold beliefs that are most sophisticated, relativistic and congruent with 'Perry C' thinking. Surprisingly, teachers' pattern of development is opposite to what has been hypothesised. Despite the fact that, in almost 70% (19 items) of the questionnaire's issues, the majority are in 'Perry C' positions, when compared to undergraduates in their first and final year and to postgraduates they form the lowest 'Perry C' population. In about 70% (19 items) of all issues, they retreat and revert back to 'Perry A' and 'Perry B' thinking forming the highest percentages on both in many cases. It can, therefore, be concluded that Perry's pattern of development is not supported by the data gained from Egyptian teachers.

The observed developmental patterns of the Egyptian groups seem in some aspects to deviate from Perry's hypothesised pattern and conform to it in others. A discussion of these consistencies and inconsistencies is presented later. First, though, the beliefs of the surveyed Scottish groups – to which the Egyptians groups are compared – are examined and presented in the chapter to come.

Chapter Eight

Data Analysis of the Scottish Sample: Phase One

8.1 Introduction

In this chapter, data for the counterpart Scottish groups are presented, analysed and discussed. The questionnaire's items and dimensions are presented in the same order as in the previous chapter. The sample sizes and group numbers for the Scottish groups are shown in the following table (Table 8.1).

	Educational College Years				Post graduates	Teachers
	Year 1	Year 2	Year 3	Year 4		
Samples (N)	118	116	114	142	275	137
Group Number	1	2	3	4	5	6

Table 8.1: Scottish Sample Sizes

8.2 Beliefs about the Nature of Ability

Part I Question 3

A	If you are intelligent, you will be able to do many things well.
C	Intelligence means different things. This means that you can be good at one thing and bad at another.

Part I – Q 3			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	2	11	2	6	4	11	4	7	2	6	2	9
			9		4		7		3		4		7	
		B	13	23	18	32	10	26	9	25	13	27	6	16
	S2		10		14		16		16		14		10	
		C	31	67	19	61	15	63	31	69	32	67	21	76
			36		42		48		38		35		55	

Part I – Q 3	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	12	23	9	11	24	12	30	2	10	19
Degree of freedom	4	5	4	4	4	4	4	4	4	4
Significance level	0.02	0.001	N.S.	0.05	0.001	0.02	0.001	N.S.	0.05	0.001

The majority of undergraduates hold 'Perry C' congruent beliefs. In year 2 and 3 of their BEd degree, students manifest a significant increase in 'Perry B' thinking. The decline in 'Perry C' thinking noticed in those years (2 and 3) is recovered again in year 4 as students end their degree with no significant difference in their perceptions from when they started. Postgraduates mirror the pattern of undergraduates in their final year. Teachers' beliefs are most congruent with 'Perry C' thinking. Compared to other groups, they significantly form the highest 'Perry C' thinkers. Over half of their population went for the extreme position of (C6).

Part I Question 8

C	Intelligence is something like a muscle that can – given the right circumstances – develop or shrink.
A	Intelligence is something genetic that you're born with. You can learn new things but you can't change it.

Part I – Q 8			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	3	6	3	7	3	9	2	6	2	6	1	7
			3		4		6		4		4		6	
		B	1	15	8	39	11	43	8	23	8	33	8	32
	S2		14		31		32		15		25		24	
		C	47	80	40	55	25	49	42	72	38	62	33	62
			33		15		24		30		24		29	

Part I – Q 8	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	47	71	12	207	28	16	34	33	4	2
Degree of freedom	3	3	3	3	3	4	4	3	4	4
Significance level	0.001	0.001	0.01	0.001	0.001	0.005	0.001	0.001	N.S.	N.S.

Initially, the majority of undergraduates start their degree with beliefs congruent with 'Perry C' thinking. Consistent significant decline in 'Perry C' thinking and increase in 'Perry B' thinking are noticed throughout the BEd degree. Nearly two thirds of postgraduates have beliefs congruent with 'Perry C' thinking. Nevertheless, they – compared to undergraduates in year 1 and 4 – form the least 'Perry C' and the highest 'Perry B' thinking. Teachers' pattern of responses is not significantly different from that of postgraduates or undergraduates in their final year.

Part I Question 18

A	Intelligent students have high IQ and do well at university.
C	Intelligence is not limited to IQ scores or to academic success.

Part I – Q 18			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	3	9	3	4	3	8	2	6	1	5	2	5
			6		1		5		4		4		3	
		B	9	27	22	43	16	32	12	35	9	26	5	21
	S2		18		21		16		23		17		16	
		C	24	65	26	53	28	61	21	59	33	70	29	74
			41		27		33		38		37		45	

Part I – Q 18	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	30	8	5	17	7	9	10	9	8	4
Degree of freedom	4	4	4	4	4	4	4	4	4	4
Significance level	0.001	N.S.	N.S.	0.005	N.S.	N.S.	0.05	N.S.	N.S.	N.S.

Undergraduates' beliefs are congruent with 'Perry C' thinking. Throughout the BEd degree, development in 'Perry B' thinking and decline in 'Perry C' thinking are noticed. Compared to the pattern observed in year 1, the changes in years 3 and 4 are insignificant. Intellectual development is high with postgraduates whose pattern of development is insignificantly different from undergraduates in their final year. Teachers' responses form the highest percentages of 'Perry C' and the lowest 'Perry B' thinking compared to all groups. It does not significantly differ from them, nevertheless.

Part II Question 1

A	The ideal lecturer can tell who is able and who is not.

Part II – Q 1			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	1 / 39	40	1 / 23	24	3 / 29	32	6 / 29	35	3 / 34	37	12 / 42	54
		B	33		59		32		35		37		27	
		C	27 / 2	29	14 / 3	17	29 / 7	36	29 / 1	30	23 / 3	26	14 / 5	19

Part II – Q 1	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	41	9	1	8	27	40	7	6	12	20
Degree of freedom	4	3	3	3	3	3	3	4	3	3
Significance level	0.001	0.05	N.S.	0.05	0.001	0.001	N.S.	N.S.	0.02	0.001

Undergraduates start their degree with 'Perry A' beliefs. Initial significant move towards 'Perry B' thinking is noticed in year 2. This is lost towards the end of their degree where students are nearly equally divided between all of Perry's thinking categories showing an even and flat distribution that does not significantly differ from year's 1 initial belief pattern. Postgraduates show similar pattern as undergraduates in their final year. Interestingly, teachers' beliefs are most congruent with 'Perry A' thinking. Nonetheless, their developmental pattern does not significantly differ from that of postgraduates.

Bringing it together

Pre- and in-service teachers' beliefs about ability can generally be summarised as follows.

From groups' responses to Part I questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking on the three issues of Part (I-3, I-8, I-18).
- development does not take a steady linear pattern: different patterns are noticed across all issues.
- students' beliefs about the nature of ability tend to decline along the years in these three issues. This decline either continues till the end of the degree (I-8), or is recovered back either in year 4 (I-3), or earlier in year 3 (I-18). In the latter two issues, students end up their degree with belief patterns that are not significantly different from those with which they started.
- the common pattern observed throughout the BEd degree years and across these issues (I-3, I-8, I-18) is the increase in 'Perry B' thinking
- the majority of postgraduates are predominantly reveal 'Perry C' thinking. Their belief patterns mirror that of undergraduates in year 1 and/or 4 in two issues (I-3, I-18).
- teachers are predominantly in 'Perry C' thinking. In (I-3), they significantly form the highest 'Perry C' population of all groups.

From groups' responses to Part II question, it is noted that

- in contrast to responses to Part I questions, the majority of undergraduates start and end at 'Perry A' positions. A flat even distribution is noticed in some groups (years 3, 4, and postgraduates). However, teachers seem to form the highest 'Perry A' thinking of all.

8.3 Beliefs about the Nature of Knowledge

Part I Question 2

A	All one has to do in studying is to memorize things paying great attention to the details.
C	Instead of just memorizing things, it is more interesting to look for patterns and relationships among information and facts, searching for the big idea behind it all.

Part I – Q 2			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	0	9	0	10	4	11	2	7	1	5	4	7
			9		10		7		5		4		3	
		B	12	27	19	40	18	25	13	29	11	22	3	9
	S2		15		21		7		16		11		6	
		C	29	64	21	51	27	65	27	64	35	74	32	85
			35		30		38		37		39		53	

Part I – Q 2	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	12	0.3	2	11	29	11	3	5	16	9
Degree of freedom	4	2	4	2	3	2	2	4	3	3
Significance level	0.01	N.S.	N.S.	0.005	0.001	0.005	N.S.	N.S.	0.005	0.02

The majority of undergraduates start their degree with Perry C' congruent beliefs. Throughout the years, there is no significant change happening except for a significant decline in 'Perry C' thinking and an increase in 'Perry B' thinking noticed in year 2. Postgraduates hold 'Perry C' congruent beliefs. Their pattern of responses insignificantly differs from undergraduates in year 4. Of all groups, teachers reveal the highest percentage of 'Perry C' thinking. Over half of them are in the extreme (C6) position.

Part I Question 6

C	Knowledge is complex and by no means all black and white. I find this exciting and stimulating. It makes me want to explore things more for myself.
A	Knowledge is a collection of facts that are right or wrong, black or white. I dislike uncertainties and vague statements.

Part I – Q 6			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	0	5	1	4	2	11	1	3	2	5	0	2
			5		3		9		2		3		2	
		B	8	21	8	36	9	31	11	29	6	21	4	8
	S2		13		28		22		18		15		4	
		C	38	75	32	60	27	58	36	67	36	76	25	90
			37		28		31		31		40		65	

Part I – Q 6	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	23	19	7	3	49	13	13	7	37	26
Degree of freedom	4	4	4	4	3	4	4	4	4	3
Significance level	0.001	0.001	N.S.	N.S.	0.001	0.02	0.02	N.S.	0.001	0.001

Initially, the majority of undergraduates hold 'Perry C' congruent beliefs. In years 2 and 3 of their BEd degree, there is a significant decline in 'Perry C' thinking for an increase in 'Perry B' thinking. The majority of postgraduates hold 'Perry C' congruent beliefs mirroring the pattern of undergraduates in years 1 and 4. Teachers show the highest percentage of 'Perry C' thinking congruency of all groups. Nearly two thirds of them are in the extreme (C6) position.

Part I Question 14

C	I don't believe that all we learn represents the 'absolute truth'; student should try to understand arguments for and against the existing knowledge.
A	What we learn outlines a set of explanations about what is happening in the world. Students need to confine themselves to absorbing this information.

Part I – Q 14			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	2	6	3	8	0	4	1	3	1	4	0	2
			4		5		4		2		3		2	
		B	6	25	11	45	19	41	12	37	9	29	2	17
			19		34		22		25		20		15	
	S2	C	41	69	28	48	36	56	33	61	43	68	37	82
			28		20		20		28		25		45	

Part I – Q 14	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	26	36	14	6	24	17	5	3	19	21
Degree of freedom	4	4	4	4	3	4	3	3	3	3
Significance level	0.001	0.001	0.01	N.S.	0.001	0.005	N.S.	N.S.	0.001	0.001

The majority of undergraduates start with 'Perry C' congruent beliefs. Throughout the BEd degree, there is a significant decline in 'Perry C' thinking as students significantly revert back to 'Perry B' thinking. Postgraduates' pattern of responses does not significantly differ from undergraduates in years 1 and 4 where the majority are in 'Perry C' thinking positions. Teachers hold beliefs most congruent with 'Perry C' thinking. Of all groups, they form the highest percentage of 'Perry C' and the lowest 'Perry B' thinking. Compares to other groups, they opt for the extreme position of (C6).

Part II Question 7

A	The information the lecturer gives or that is in the textbooks is far more important than any class activities which require thinking about what we already know or what we have learned.

Part II – Q 7			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	1	4	2	14	4	17	1	14	1	6	0	5
			3		12		13		14		5		5	
		B	20		28		26		19		21		9	
		C	66	77	50	58	50	57	58	67	65	73	58	87
			11		8		7		9		9		29	

Part II – Q 7	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	46	68	50	6	46	1	5	9	27	32
Degree of freedom	3	3	3	3	3	3	3	3	3	3
Significance level	0.001	0.001	0.001	N.S.	0.001	N.S.	N.S.	0.05	0.001	0.001

Initially the majority of undergraduates start their BEd degree with beliefs congruent with 'Perry C' thinking. Throughout the years, there is a consistent significant decline in 'Perry C' thinking for an increase in 'Perry A' and/or 'Perry B' beliefs. The majority of postgraduates are in 'Perry C' thinking positions – mirroring undergraduates in year 1. Teachers significantly form the highest percentages of 'Perry C' thinkers and the lowest 'Perry B' thinkers compared to other groups.

Part II Question 8

A	In learning I don't like to encounter information which contradicts what I already know. I find that confusing.

Part II – Q 8			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	6 / 31	37	8 / 39	47	9 / 28	37	7 / 30	37	2 / 21	23	0 / 15	15
		B	31		35		26		20		26		16	
		C	31 / 2	32	18 / 0	18	30 / 7	37	40 / 3	43	48 / 3	51	57 / 13	70

Part II – Q 8	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	10	3	11	49	154	28	4	9	26	21
Degree of freedom	3	3	3	3	3	3	3	3	3	3
Significance level	0.02	N.S.	0.02	0.001	0.001	0.001	N.S.	0.05	0.001	0.001

Initially undergraduates start their BEd degree with an almost flat distribution among all Perry's thinking categories. An initial drift for 'Perry A' thinking is noticed in year 2. However, development is noticed as students move from 'Perry B' to 'Perry C' thinking ending their degree with the majority holding 'Perry C' beliefs. Postgraduates are significantly higher in 'Perry C' thinking than undergraduates. Nonetheless, their 'Perry C' thinking percentage is not as high as that of teachers who form the highest 'Perry C' thinking and the least 'Perry B' and 'Perry A' thinking of all groups.

Bringing it together

Pre- and in-service teachers' beliefs about the nature of knowledge can generally be summarised as follows:

From groups' responses to Part I and Part II questions, it is clear that

- the majority of undergraduates start their degree with 'Perry C' thinking in (I-2, I- 6, I-14, and II-7).
- the majority of undergraduates end their degree with 'Perry C' thinking in all issues (I-2, I- 6, I-14, II-7 and II-8)
- nonetheless, throughout their degree years, students' beliefs about the nature of knowledge tend to decline in these four issues (I-2, I- 6, I-14, and II-7). Development takes place only in (II-8).
- different patterns of change are noticed all along. While in (I-14) the percentage of students in 'Perry C' thinking decline till the end of their degree, in others resurgence to 'Perry C' thinking takes place in year 4 (I-6) or in year 3 (I-2) when students end with beliefs insignificantly different from their entering ones.
- common across all issues is the increase in 'Perry B' thinking.
- the majority of postgraduates are in 'Perry C' thinking positions. In most issues (I-2, 6, 14, II-7), their pattern of responses insignificantly differs from undergraduates in year 1 and/or 4.
- teachers are predominantly in 'Perry C' thinking. They significantly form the highest 'Perry C' thinking in all issues. In their responses (I-2, I-6, I-14), they opt for the extreme position of (C6).

8.4 Beliefs about the Role of Peers

Part I Question 15

A	I don't like it when students disagree. Disagreement means no one understands what is being discussed.
C	I like it when students disagree. I understand more as a result of these discussions.

Part I – Q 15			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	2	3	0	5	2	8	0	1	1	3	0	1
			1		5		6		1		2		1	
		B	3	22	5	30	11	34	3	21	2	26	2	12
			19		25		23		18		24		10	
	S2	C	35	77	36	65	26	58	38	78	46	72	36	88
			42		29		32		40		26		52	

Part I – Q 15	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	13	47	1	31	12	12	29	9	7	31
Degree of freedom	3	3	3	3	3	4	3	3	3	3
Significance level	0.005	0.001	N.S.	0.001	0.01	0.02	0.001	0.05	N.S.	0.001

The majority of undergraduates start their degree with 'Perry C' congruent beliefs. Despite initial retreat in years 2 and 3 for 'Perry B' thinking, resurgence of undergraduates' 'Perry C' beliefs takes place in the final year of the degree when students end with beliefs insignificantly different from the initial beliefs of year 1 students. The majority of postgraduates hold 'Perry C' congruent beliefs that are statistically lower than those of undergraduates in years 1 and 4. Compared to undergraduates in their first year and postgraduates, teachers significantly form the highest percentage of 'Perry C' and the lowest 'Perry A and B' thinkers. Above half of them went for the extreme position of (C6).

Part II Question 4

B	I find working in groups a good opportunity to discuss things with my peers and to listen to their viewpoints. However, I consider the final word of the lecturer to be much more important.

Part II – Q 4			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	B	7	36	11	41	14	36	7	45	7	36	4	13
			29		30		22		38		29		10	
			35		27		21		26		28		24	
			28	30	30	33	34	44	26	28	32	35	52	63
			2		3		10		2		3		11	

Part II – Q 4	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	5	20	7	6	73	8	29	4	43	36
Degree of freedom	3	3	3	3	3	3	3	3	3	4
Significance level	N.S.	0.001	N.S.	N.S.	0.001	0.05	0.001	N.S.	0.001	0.001

Initially undergraduates' beliefs are divided among all Perry's thinking positions exhibiting an even distribution. Throughout the years no significant changes are noticed except in year 3 when students indicate more preference for 'Perry B' thinking. Postgraduates' beliefs are not statistically different from that of undergraduates' in years 1 and 4. Of all groups, teachers significantly form the least 'Perry B' thinking.

Part II Question 6

C	My peers and I can be just as reliable a source of assessment as the teachers.

Part II – Q 6			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	2 / 15	17	0 / 9	9	2 / 14	16	0 / 13	13	1 / 13	14	2 / 8	10
		B	31		29		21		28		30		22	
		C	44 / 9	53	43 / 20	63	46 / 17	63	46 / 14	60	47 / 9	56	48 / 21	69

Part II – Q 6	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	22	13	6	4	32	11	7	2	2	13
Degree of freedom	3	3	3	4	4	3	4	3	3	3
Significance level	0.001	0.005	N.S.	N.S.	0.001	0.02	N.S.	N.S.	N.S.	0.01

The majority of undergraduates' beliefs are congruent with 'Perry C' thinking. Through their BEd degree, students' beliefs tend to develop as indicated in the significant increase in 'Perry C' thinking noted in years 2 and 3. Undergraduates, nonetheless, end their degree with belief pattern that insignificantly differ from that of year 1 students. The majority of postgraduates mirror in their responses the pattern of undergraduates in years 1 and 4. Teachers show the highest percentage of 'Perry C' thinking of all groups. Yet, statistically they mirror undergraduates in year 4.

Part II Question 9

C	The views of my peers could sometimes sound more important, critical and worth some thought than those of the lecturer or those in the textbooks.

Part II – Q 9			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S	A	2 / 6	8	1 / 6	7	1 / 8	9	1 / 8	9	1 / 9	10	2 / 4	6
		B	42		36		37		32		35		18	
		C	47 / 4	51	48 / 10	58	42 / 12	54	55 / 5	60	47 / 9	56	58 / 19	77

Part II – Q 9	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	9	19	5	16	89	2	12	3	18	21
Degree of freedom	3	3	3	3	3	3	3	3	3	3
Significance level	0.05	0.001	N.S.	0.005	0.001	N.S.	0.01	N.S.	0.001	0.001

The majority of undergraduates start their BEd degree with beliefs congruent with 'Perry C' thinking. Throughout their degree, there is a consistent increase in 'Perry C' thinking. Students' beliefs develop as they significantly move from 'Perry B' to 'Perry C' positions. Nonetheless, compared to year 1, the development noticed in year 4 is not statistically significant. Postgraduates' beliefs show the same pattern of development as that of undergraduates in year 4 where the majority hold 'Perry C' beliefs. Of all groups, the teachers' group shows the highest percentage of 'Perry C' thinking and the lowest 'Perry B' thinking.

Bringing it together

The analysis of pre- and in-service teachers' beliefs about the role of peers is summarised as follows:

From groups' responses to Part I and II questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking in three of the four issues (I-15, II-6, II-9).
- development does not take a consistent linear pattern, different patterns are noticed for the different issues. While undergraduates' beliefs – throughout most of their degree years – reveal no significant change in (II-4) (predominantly 'Perry B'), they significantly develop in other issues (II-6, II-9). Decrease in 'Perry C' thinking is noticed in (I-15). In all of these issues, undergraduates end up their degree with belief pattern that is statistically not different from that of undergraduates year 1 group.
- in three of the four issues (I-15, II-6, II-9), postgraduates hold 'Perry C' beliefs. In all issues their belief patterns mirror those of undergraduates in year 1 and/or 4.
- on most issues (I-15, II-6, II-9), the teachers group hold 'Perry C' congruent beliefs. They significantly form the highest percentage of 'Perry C' thinking. However, in their responses to issues (I-15, II-6), their pattern of responses is statistically insignificant from that of undergraduates in their final year.

8.5 Beliefs about Assessment

Part I Question 1

A	In exams, my job is to give back the information provided on the course as accurately as possible.
C	In exams, my job is to answer the questions using information I have been taught as well as information I have gained for myself.

Part I – Q 1			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	3	4	1	1	3	5	1	5	3	6	3	13
			1		0		2		4		3		10	
		B	2	11	0	12	3	22	8	19	4	14	5	19
			9		12		19		11		10		14	
	S2	C	26	86	24	87	24	74	23	76	27	79	22	69
			60		63		50		53		52		47	

Part I – Q !	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	5	13	21	18	50	20	13	3	6	7
Degree of freedom	3	3	3	3	3	3	3	4	4	3
Significance level	N.S.	0.005	0.001	0.001	0.001	0.001	0.005	N.S.	N.S.	N.S.

The majority of undergraduates have beliefs congruent with 'Perry C' thinking. Despite no significant change noticed in year 2, students throughout the rest of their degree significantly retreat in their 'Perry C' beliefs indicated by the consistent decrease in 'Perry C' percentages and an increase in 'Perry B' thinking. Postgraduates mirror year 4 undergraduates' pattern of development where most of the population hold 'Perry C' beliefs. Teachers' beliefs are congruent with 'Perry C' thinking. Nevertheless, they form the lowest 'Perry C' percentage and the highest 'Perry A' thinking of all groups.

Part I Question 4

A	I prefer questions which require short answers and are based on the course.
C	I find short answer questions restrictive, as they don't give me the opportunity to go beyond what is taught and show my ability to think

Part I – Q 4			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	10	25	6	29	20	37	13	23	7	16	2	9
			15		23		18		10		9		7	
		B	20	43	35	52	19	35	18	42	20	48	17	41
			23		17		16		24		28		23	
	S2	C	19	33	10	20	16	28	23	35	23	37	21	50
			14		10		12		12		14		29	

Part I – Q 4	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	22	13	6	16	37	17	19	5	17	15
Degree of freedom	4	5	5	5	4	4	5	5	4	4
Significance level	0.001	0.02	N.S.	0.01	0.001	0.005	0.005	N.S.	0.005	0.005

The majority of undergraduates start their BEd degree with beliefs distributed among Perry's three thinking positions with the majority in 'Perry B' thinking. Throughout most of their degree years, a consistent decline in 'Perry C' thinking is noticed for increase in 'Perry A' and/or 'Perry B'. In year 4, students seem to go back to a belief pattern similar to that with which they started their degree. The majority of postgraduates – mirroring undergraduates in year 4 – hold 'Perry B' thinking. Teachers are most congruent with 'Perry C' thinking. They form the highest 'Perry C' thinking of all groups.

Part I Question 7

C	To me being assessed is not a real threat. It is an opportunity for feedback and improvement of learning and teaching.
A	Feedback is not of much importance as getting high grades if not the best grades. It is the most important aspect of my assessment

Part I – Q 7			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	1	3	0	8	3	13	4	7	1	3	0	5
			2		8		10		3		2		5	
		B	9	31	17	45	12	39	11	34	5	33	5	21
			22		28		27		23		28		16	
	S2	C	39	67	35	48	30	49	36	60	34	64	32	75
			28		13		19		24		30		43	

Part I – Q 7	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	32	26	6	8	14	8	9	9	12	10
Degree of freedom	3	3	3	3	3	4	4	4	4	3
Significance level	0.001	0.001	N.S.	N.S.	0.005	N.S.	N.S.	N.S.	0.02	0.05

Though the majority of students start their degree with beliefs congruent with 'Perry C' thinking, through most of their BEd degree there is a consistent decline in that population as students seem to significantly retreat from 'Perry C' thinking to 'Perry A' and 'Perry B' positions. However, students seem to end their degree with beliefs insignificantly different from those with which Year 1 students started. Postgraduates show a developmental pattern that is statistically not different from that of undergraduates in years 1 and 4. The teachers' group, nevertheless, are the least with 'Perry B' thinkers of all groups. The beliefs of their majority are mostly congruent with 'Perry C' thinking.

Part I Question 12

C	I believe in exams what matters is the quality of my answers, not how much information I provide
A	In exams, I expect to be rewarded for giving as much information as possible.

Part I – Q 12			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	3	8	0	1	4	8	2	4	3	7	3	8
			5		1		4		2		4		5	
		B	4	31	9	34	10	32	5	24	7	27	9	24
			27		25		22		19		20		15	
	S2	C	23	61	31	66	30	61	33	72	34	66	38	68
			38		35		31		39		32		30	

Part I – Q 12	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	5	13	12	30	31	9	9	3	6	2
Degree of freedom	3	4	4	4	4	3	3	4	4	4
Significance level	N.S.	0.02	0.02	0.001	0.001	0.05	0.05	N.S.	N.S.	N.S.

Initially, the beliefs of the majority of undergraduates show congruency with 'Perry C' thinking. In years 2 and 4, development is noticed by the consistent increase in 'Perry C' thinking that reaches the highest percentage in the final year. Belief fluctuation is noticed. Postgraduates' beliefs show a pattern of development that does not significantly differ from that of undergraduates in year 4. The majority of teachers – similar to undergraduates in year 4 and postgraduates – have 'Perry C' congruent beliefs.

Part II Question 2

A	When I start a new course, the most important aspect is knowing the assessment procedures.

Part II – Q 2			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	6	27	5	41	9	37	3	33	6	34	4	29
			21		36		28		30		28		25	
		B	39		32		25		42		32		27	
	S2	C	33	33	24	27	31	39	25	25	33	34	36	44
			0		3		8		0		1		8	

Part II – Q 2	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	15	11	9	9	12	13	29	6	13	4
Degree of freedom	3	3	3	3	3	3	3	3	3	3
Significance level	0.005	0.02	0.02	0.02	0.01	0.005	0.001	N.S.	0.005	N.S.

Throughout their BEd degree, overt oscillation in undergraduates' responses is noticed. Consistent increase in 'Perry A' thinking is also noticed. Though there is an initial development noticed in the move for 'Perry C' thinking in year 3, students revert back to 'Perry B' in the final year of their degree forming the highest percentage of all groups. Postgraduates' responses reveal an equal division among Perry's three thinking categories that does not significantly differ from undergraduates in year 4. Teachers pattern of responses does not differ from that of postgraduates. They, however, are most congruent with 'Perry C' thinking.

Bringing it together

Pre- and in-service teachers' beliefs about the nature of assessment are summed up as follows:

From groups' responses to Part I and II questions, it is clear that

- the majority of undergraduates start and end their degree with either 'Perry C' thinking in three of the five issues (I-1, I-7, I-12) or with 'Perry B' thinking in (I-4, II-2).
- undergraduates' beliefs about the nature of assessment tend to decline along most of their study years manifested in the decrease of 'Perry C' and the increase in 'Perry B' and/or 'Perry A' thinking (I-1, I-4, I-7, II-2). Consistent development takes place only in one issue (I-12).
- postgraduates are predominantly at 'Perry C' thinking (I-1, I-4, I-7, I-12, II-2).
- postgraduates' beliefs seem to insignificantly differ from those of undergraduates in years 1 and/or 4 in all issues.
- teachers hold 'Perry C' beliefs about assessment in all issues (I-1, I-4, I-7, I-12, II-2). Compared to other groups, they, significantly, form the highest percentage of 'Perry C' thinking in (I-4, I-12) and, interestingly, the lowest 'Perry C' thinking in (I-1).

8.6 Beliefs about the Role of the Student

Part I Question 9

A	The best way to pass my courses, I believe is to study just what the lecturer tells me.
C	I don't have to rely totally on the lecturer. Part of my learning is to work things out myself.

Part I – Q 9			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	2	7	1	7	4	11	4	7	5	8	2	7
			5		6		7		3		3		6	
		B	5	19	10	32	14	27	15	36	8	21	7	17
	S2		14		22		13		21		13		10	
		C	32	75	39	62	25	62	33	58	41	72	39	77
			43		23		37		25		31		38	

Part I – Q 9	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	22	23	42	20	6	23	16	10	15	3
Degree of freedom	4	4	4	4	4	4	4	4	4	4
Significance level	0.001	0.001	0.001	0.001	N.S.	0.001	0.005	0.05	0.005	N.S.

The majority of undergraduates have 'Perry C' congruent beliefs. Compared to undergraduates in year 1, students' beliefs reveal – throughout their degree – a significant and consistent decrease in 'Perry C' thinking – to reach its lowest percentage in year 4 – and a consistent increase in the 'Perry B' thinking. The majority of postgraduates are in 'Perry C' thinking. Of all groups, the highest percentage of 'Perry C' thinkers is in the teachers group. Their belief pattern does not statistically differ from year 1 undergraduates and postgraduates.

Part I Question 10

C	Students should take some responsibility and have a say in deciding what to learn, how to learn and how to be assessed.
A	Lecturers are experts in their subjects. If things at times look confusing, it is so because they want us to think for ourselves.

Part I – Q 10			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	10	30	1	15	3	10	1	10	1	5	2	6
			20		14		7		9		4		4	
		B	24	47	23	55	13	35	16	46	18	43	10	35
	S2		23		32		22		30		25		25	
		C	15	24	23	29	30	55	24	44	33	52	33	59
			9		6		25		20		19		26	

Part I – Q 10	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	18	74	54	151	113	80	9	7	7	7
Degree of freedom	4	4	4	4	4	4	4	4	4	4
Significance level	0.005	0.001	0.001	0.001	0.001	0.001	N.S.	N.S.	N.S.	N.S.

Initially the majority of undergraduates start with 'Perry B' views. Throughout their degree, development is noticed as indicated in the consistent decline of 'Perry A' thinking for an increase in 'Perry B' and/or 'Perry C' thinking. Oscillation in students' views is noticed all through. The majority of postgraduates and teachers hold 'Perry C' congruent beliefs that do not significantly differ either from each other or from undergraduates in their final year.

Part I Question 13

C	Students should be given the chance to pursue their own interests in class.
A	If students are given the chance to pursue their interests in the class, we might end up not learning enough of the course.

Part I – Q 13			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	6	17	2	10	2	13	3	16	6	19	2	15
			11		8		11		13		13		13	
		B	16	50	15	56	15	50	11	47	19	54	16	46
			34		41		35		36		35		30	
	S2	C	22	32	26	35	24	37	23	37	17	27	26	39
			10		9		13		14		10		13	

Part I – Q 13	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	7	2	4	4	3	6	3	6	2	6
Degree of freedom	4	4	4	5	4	4	4	4	4	4
Significance level	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Across all groups, beliefs tend to be in agreement with 'Perry B' thinking. Throughout the BEd degree, students' beliefs seem to remain intact. Similarly, postgraduates' and teachers' beliefs are predominantly in 'Perry B' thinking positions with no significant differences observed all through.

Part I Question 16

A	I can't be wrong if I accept what the lecturer says. If I question anything I might end up failing.
C	I don't believe in just accepting what the lecturer says without question. Success involves thinking for myself.

Part I – Q 16			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	1	4	2	6	3	13	3	8	1	5	2	4
			3		4		10		5		4		2	
		B	6	27	10	33	17	30	15	34	10	32	7	18
			21		23		13		19		22		11	
	S2	C	30	70	37	61	22	57	36	59	37	63	27	78
			40		24		35		23		26		51	

Part I – Q 16	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	15	54	39	28	11	28	24	4	26	26
Degree of freedom	3	3	3	3	3	4	4	4	4	4
Significance level	0.005	0.001	0.001	0.001	0.02	0.001	0.001	N.S.	0.001	0.001

The majority of undergraduates are in 'Perry C' thinking positions. Despite the slight oscillation traced in their responses, the percentage of students at 'Perry C' thinking positions significantly decreases throughout the years for an increase in 'Perry A' and 'Perry B' thinking. The majority of postgraduates show pattern of responses that is congruent with 'Perry C' thinking, yet does not significantly differ from that of undergraduates in year 4. The teachers' group forms the highest percentages of 'Perry C' and the lowest 'Perry B' thinking of all groups.

Part I Question 17

A	I don't like vague assignment where the lecturer does not specify exactly what is required from you and how to get it done.
C	I enjoy undertaking tasks where the lecturer does not specify exactly what to be done and it is left to me to decide.

Part I – Q 17			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	38	62	41	70	51	69	37	71	30	52	15	41
			24		29		18		34		23		26	
		B	28	33	21	27	18	25	16	21	21	36	24	34
			5		6		7		5		16		10	
	S2	C	4	6	4	4	4	6	4	6	9	12	19	26
			2		0		2		2		3		7	

Part I – Q 17	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	4	13	13	93	142	11	26	19	37	21
Degree of freedom	3	4	4	4	4	3	4	4	4	4
Significance level	N.S.	0.02	0.02	0.001	0.001	0.01	0.001	0.001	0.001	0.001

The majority of undergraduates' beliefs are in 'Perry A' thinking all through the BEd years. Initially they start with the majority at 'Perry A' thinking. Through their degree years, there is a significant increase in 'Perry A' thinking and a consistent decrease in 'Perry B' thinking. The majority of postgraduates hold beliefs congruent with 'Perry A' thinking. Compared to other undergraduate groups, they significantly form the least 'Perry A' thinking. Postgraduates tend to agree more with 'Perry B and C' thinking. The majority of teachers hold 'Perry A' beliefs. Nonetheless, they form the lowest 'Perry A' and the highest 'Perry C' Percentage compared to all groups.

Bringing it together

From groups' responses to Part I and Part II questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking in two issues (I-9, I-16), 'Perry B' thinking in issues (I-10, I-13) and 'Perry A' thinking in (I-17).
- various patterns of development are noticed. While in most issues (I-9, I-16, I-17) students' beliefs tend to regress, development is noticed only in (I-10). Despite that students end their degree in (I-10) with the majority hold beliefs divided between 'Perry B' and 'Perry C' views still. Students' beliefs in (I-13) are mostly 'Perry B' and undergo no significant change throughout the degree years.
- the majority of the postgraduate and the teachers groups hold 'Perry C' congruent beliefs in three issues (I-9, I-10, I-16) with teachers forming the highest percentage of 'Perry C' thinkers in all three. Both groups have 'Perry B' beliefs in (I-13) and 'Perry A' beliefs in (I-17). Still, teachers' 'Perry C' beliefs are the highest in both. The difference is not necessarily significant, nevertheless.

8.7 Beliefs about The Role of the Teacher

Part I Question 5

C	I think a good lecturer should point out some of the conflicting views on an issue. Students should be given the opportunity to weigh them up.
A	A good lecturer is the one who points out to students the one accepted view on an issue or at least his preferred one.

Part I – Q 5			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	0	0	0	3	0	3	1	2	1	3	1	3
			0		3		3		1		2		2	
		B	2	8	7	25	5	15	2	6	3	13	2	4
			6		18		10		4		10		2	
	S2	C	38	92	30	72	29	83	30	92	34	84	21	93
			54		42		54		62		50		72	

Part I – Q 5	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	75	32	7	34	28	8	10	8	4	21
Degree of freedom	3	3	3	3	3	3	3	3	3	3
Significance level	0.001	0.001	N.S.	0.001	0.001	0.05	0.02	0.05	N.S.	0.001

The majority of undergraduates hold 'Perry C' congruent beliefs. This is particularly high in their first year. In years 2 and 3, there is a significant decline in 'Perry C' thinking for an increase in 'Perry B' thinking. In their final year, an increase back in 'Perry C' thinking is noticed to form a pattern of responses insignificantly different from that of year 1 students. Postgraduates and teachers are congruent with 'Perry C' thinking. Teachers' responses do not statistically differ from those of undergraduates in their final year.

Part I Question 11

A	I think a good lecturer should avoid teaching materials that they know students will find difficult.
C	Lecturer should aim at providing challenges to their students by introducing difficult topics.

Part I – Q 11			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	0	4	1	10	6	20	4	13	2	6	2	6
			4		9		14		9		4		4	
		B	13	39	24	54	21	45	19	49	14	41	12	28
			26		30		24		30		27		16	
	S2	C	34	57	29	36	19	35	24	38	34	54	35	66
			23		7		16		14		20		31	

Part I – Q 11	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	34	84	38	4	10	33	9	12	24	10
Degree of freedom	4	4	4	4	4	4	4	4	4	4
Significance level	0.001	0.001	0.001	N.S.	0.05	0.001	N.S.	0.05	0.001	0.05

Initially, the majority of undergraduates start their degree with beliefs congruent with 'Perry C' thinking. However, there is a consistent decrease in 'Perry C' thinking throughout the years for an increase in 'Perry B and A' thinking. Students end their degree with the majority reverting to 'Perry B' positions. The majority of postgraduates hold 'Perry C' beliefs – mirroring undergraduates in year 1. The majority of teachers hold 'Perry C' congruent beliefs. Of all groups, they form the highest percentage of 'Perry C' and the least of 'Perry B' thinking.

Part II Question 3

C	Perplexing as it may sometimes appear, I find my lecturers different points of view very interesting and stimulating.

Part II – Q 3			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	0 / 1	1	1 / 4	5	1 / 7	8	0 / 3	3	0 / 2	2	1 / 0	1
		B	8		14		20		16		14		5	
	S2	C	77 / 14	91	68 / 14	82	51 / 21	72	67 / 15	82	68 / 16	84	56 / 38	94

Part II – Q 3	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	24	20	20	20	63	16	16	8	26	28
Degree of freedom	3	3	3	3	3	4	4	3	3	4
Significance level	0.001	0.001	0.001	0.001	0.001	0.005	0.005	0.05	0.001	0.001

The majority of undergraduates' beliefs are in agreement with 'Perry C' thinking. Nonetheless, students' 'Perry C' beliefs are in decline all through their degree. An increase in 'Perry B' thinking is also noticed. The majority of postgraduates have beliefs congruent with 'Perry C' thinking. Teachers' beliefs are congruent with 'Perry C' thinking as well. However, compared to all groups, they form the highest 'Perry C' and the least 'Perry B' thinking, yet again.

Part II Question 5

A	If lecturers would stick to the information and the facts they are teaching and do less theorizing, one could get more out of their classes.

Part II – Q 5			Education College Years								Post Graduates		Teachers	
			Year 1		Year 2		Year 3		Year 4					
Position %	S1	A	1 / 11	12	10 / 24	34	11 / 12	23	4 / 24	28	3 / 13	16	1 / 2	3
		B	26		34		33		28		31		19	
	S2	C	59 / 3	62	30 / 3	32	32 / 12	44	44 / 1	45	49 / 4	53	60 / 18	78

Part II – Q 5	Comparisons between									
	1-2	1-3	1-4	1-5	1-6	2-3	3-4	4-5	4-6	5-6
Chi Square	66	54	36	12	95	12	24	9	52	40
Degree of freedom	3	3	3	3	4	3	3	3	4	3
Significance level	0.001	0.001	0.001	0.01	0.001	0.01	0.001	0.05	0.001	0.001

Initially, the majority of undergraduates start with responses congruent with 'Perry C' thinking. Compared to year 1, students' 'Perry C' beliefs are in significant decrease for an increase in 'Perry A and B' thinking. Over half of postgraduates have beliefs that are congruent with 'Perry C' thinking. Yet again, teachers represent the highest 'Perry C' thinking and the least 'Perry A and B' thinking of all groups.

Bringing it together

Pre- and in-service teachers' beliefs about the role of the teacher are now summarised as follows:

From groups' responses to Part I and II questions, it is clear that

- the majority of undergraduates start and end their degree with 'Perry C' thinking in all of the four issues (I-5, I-11, II-3, II-5).
- students' 'Perry C' beliefs tend to decline throughout all of their degree years in all issues except for their responses in (I-5) as resurgence to 'Perry C' beliefs takes place in year 4.
- the majority of postgraduates are predominantly in 'Perry C' thinking positions. Only in (I-11) they mirror undergraduates in year 1.
- similarly, the teachers group hold 'Perry C' beliefs about their role in all issues (I-5, I-11, II-3, II-5). Nevertheless, compared to other groups, they form the highest 'Perry C' thinking of all. This is statistically significant in (I-11, II-3, II-5).

8.8 Conclusion

General conclusions from this data are now summarised.

Undergraduates

According to Perry's model, students start their university degree with dualistic 'Perry A' beliefs. This is not supported by the Scottish data where students in almost 70% (19 items) of the questionnaire's issues start their degree with positive beliefs and perceptions in agreement with 'Perry C' thinking. Only in (30% of the questionnaire's items – 8 items) did students start their degree with 'Perry A' (11% – 3 items) and 'Perry B' beliefs (19% – 5 items).

Perry found that, towards the end of their degree, students hold beliefs that are relativistic and in accord with 'Perry C' thinking. This is confirmed here, with 'Perry C' beliefs being indicated in almost 74% (20 items) of the questionnaire's issues. Nevertheless, only in 11% of the questionnaires issues (3 items) did students significantly develop towards more 'Perry C' thinking. In the rest of the questionnaire's issues, they either regressed (41% – 11 items) or showed the same pattern of students in year 1 (48% – 13 items).

Perry noticed that the pattern of development progresses linearly and hierarchically from 'Perry A' to 'Perry B', ending with 'Perry C' thinking: the climax of development students reach in their final year. The observed pattern of development of the Scottish students is not completely consistent with Perry's ideal pattern. Three observations are noticed in their responses. First, a consistent clear-cut trend of linear development from 'Perry A', to 'Perry B' and ultimately 'Perry C' beliefs is not seen, as students' views frequently appear to oscillate mostly revealing various patterns unique to each issue. Second, by the end of the degree, students' beliefs on many issues either were in 'Perry A' and 'Perry B' beliefs still (nearly 26% – 7 items), remained intact (nearly 48% – 13 items), or significantly retreated to 'Perry A' and/or 'Perry B' (41% – 11 items). Third, the pattern of going for less strong positions noticed with the Egyptian groups is not identified here. However, there is another pattern noticed in some issues (6 items) across three dimensions (Perceptions of Ability, the Nature of Knowledge, and the Role of Peers) where students' views change either regress (I-3, I-18, I-2, I-6, I-15) or develop (II-1) through the years 2 and 3, yet – by the end of their degree (year 4) – they come back again to be significantly not different from students' beliefs in year 1.

Perry's assumption that this pattern of development is an overall general tendency of development maintained across all dimensions is not identified here either. Different patterns of 'development' and/or 'regression' and/or 'no significant change' are frequently discerned in students' responses to the issues involved in each dimension. The only developmental pattern consistently observed across all dimensions is the increase in 'Perry B' thinking throughout the years. It can, therefore, be concluded that the cognitive developmental pattern described by Perry is not identified in Scottish undergraduate students either.

Postgraduates

Postgraduates are hypothesised to be holding 'Perry C' beliefs. This hypothesis is supported as 'Perry C' congruent responses are identified in almost 78% (21 items) of the questionnaire's items. In almost 63% (17 item) of the questionnaire's items, postgraduates' beliefs seem not to differ significantly from undergraduates' beliefs in their final year. They, unlike the Egyptian group, did not markedly form the highest 'Perry C' population of all groups. In fact that is the pattern mostly noticed with Scottish teachers' responses, discussed next.

Teachers

Perry's conceptualisation of teachers being at the other end of the model – in 'Committed to Relativism' position – is strongly supported here. Scottish teachers hold beliefs that are most sophisticated, relativistic and congruent with 'Perry C' thinking compared with all other groups in almost 85% (23 items) of the questionnaires issues. Moreover, they – in almost 78% (21 items) of the questionnaire's issues – form the highest 'Perry C' thinking of all groups and in 59% (16 items) they form the least 'Perry B' and/or 'Perry A' thinking. To conclude, it can be said that Perry's pattern of development is supported by data gained from Scottish teachers.

The results presented so far of the Egyptian and Scottish groups have revealed aspects of similarities and differences. The profile of the developmental patterns each presented also revealed consistencies as well as contradictions with Perry's original pattern of his model 'Ethical and Intellectual Development'. More insight into that is explained, investigated, and interpreted in the following chapter.

Chapter Nine

Discussion and Follow-Up Investigations: Phase One

9.1 Introduction

The purpose of this chapter is to take the analysis presented in the previous two chapters a step further. The following discussion aims at providing an understanding – through follow up investigations – and an interpretation of the presented belief profiles. In light of Perry's model of 'Intellectual and Ethical Development', parallels are drawn and distinct differences are identified between the Egyptian and Scottish data.

In considering the analysis and interpretation of the data, two issues should be considered. First, the purpose of this investigation is not to conduct a meticulous comparison between the Egyptian and the Scottish groups but rather to identify the underpinning 'universal' human patterns of development that are conceptualised in Perry's model. Second, the current study is not a longitudinal one. The drawback of conducting a cross-sectional study relates to the previous experiences of the participants of each cohort and how this might impact on the findings. In considering a certain cohort's background what may appear as regressions in comparison to other groups may actually represent development to this particular cohort. It is important to take into account that the pattern each group reveals may be particular to it. Nevertheless, Perry's (1970) model – the guiding framework of this study – anticipates a transcultural developmental pattern with positions that are invariant, successive and hierarchical. Comparisons, therefore, are considered valid.

9.2 Undergraduates' Beliefs

The aim of this phase of the study is to find out how pre-service teachers' educational beliefs about aspects of learning and teaching change over time, to investigate the pattern of change, to examine if it is an overall general tendency consistent through all dimensions and to question its cultural generalisability. In light of Perry's model, the following hypotheses are made.

Hypothesis 1: Undergraduates start their university degree with simple dualistic 'Perry A' thinking.

Hypothesis 2: Undergraduates reach the climax of their development with sophisticated relativistic 'Perry C' beliefs by the end of their university degree.

Hypothesis 3: As undergraduates progress through their degree, their beliefs develop in a linear pattern from 'Perry A' to 'Perry B' and ultimately 'Perry C' thinking.

Hypothesis 4: This development is an overall general tendency that is commonly found across all dimensions.

Hypothesis 5: This pattern is culturally generalisable and assumed to be common to both the Egyptian and the Scottish contexts.

Examining data from both the Egyptian and the Scottish contexts, it is clear that Perry's hypotheses are not verified in the undergraduate groups of both contexts. Interestingly, the

overall general patterns of both the Egyptian and Scottish groups seem to share more with each other than they do with Perry's patterns.

From the current investigation, five significant findings are detected in both contexts the Egyptian and the Scottish.

First, Egyptian and Scottish undergraduates start their degree mostly with 'Perry C' thinking in respectively 74% and 70% of the questionnaire's items. Second, Egyptian and Scottish undergraduates end their degree mostly with 'Perry C' thinking in respectively 78% and 74% of the questionnaire's issues. Third, albeit this 'Perry C' congruent ending of the degree, in many issues that did not reflect the climax of students' development as hypothesised by Perry. Only on about 52% and 15% of the responses of Egyptian and Scottish groups respectively did students end up their degree with more holding 'Perry C' thinking than when they started the degree. As been explored through their responses, students throughout the years either retreat or finished their degree holding the same beliefs with which they started. Therefore, as been indicated from the data, students' journey of development (or more accurately of change) throughout their degree does not take a clear-cut, consistent, linear path from 'Perry A' to 'Perry B' ending with 'Perry C' thinking. Fourth, fluctuation and various patterns of development were noticed across all dimensions either of 'development', 'reversion', or of 'no significant change'. An overall general tendency of development as that hypothesised by Perry is not identified in both contexts. Fifth, the cognitive developmental patterns detected from the Egyptian and Scottish groups are not in agreement with that described by Perry's theory. Furthermore, a reversed cognitive developmental pattern was identified in both groups where students start with beliefs that are more in congruence with 'Perry C' thinking than those with which they completed their degree. This finding questions the cultural generalisability of the scheme.

Interestingly, this observed pattern where students' beliefs by the end of their degree in many issues were either in 'Perry A' and/or 'Perry B' beliefs still, remained intact, or significantly retreated to 'Perry A' and/or 'Perry B' thinking is not unique to the Egyptian and Scottish undergraduate groups. Findings from other studies (Al-Shibli, 2003; Selepeng, 2000; Zhang, 2004b) conducted respectively on Omani, South African, and Chinese university students seem to confirm this finding.

In trying to explain why this specific pattern that reverses Perry's anticipated one is seen, Al-Shibli and Selepeng, on one hand, related students' decline to "the fear of their future after they graduate from the colleges...usually students' intellectual development tends to decline when students fear that they will move to new situation" (Al-Shibli, 2003, 131). Zhang, on the other hand, related this trend to the nature of the learning environment that students encountered during their education. She builds her argument soundly on the interactionist view of Perry and Piaget – as previously described in chapter five – stating that "Chinese students were very much deprived of the opportunities for making their own choices and/or decisions in a number of important areas, including curricula, career

choices, academic majors, and residential arrangements" (2004b, 131). As a matter of fact, it can be argued that in *some* aspects both explanations ring true to the educational systems and cultures involved in these studies and that might well be the case for the Egyptian and Scottish students.

However, it is clear that the focus of these interpretations was mainly the observed pattern of retreat of final year students. The fact that students' responses in the first year of their degree are in strong accord with 'Perry C' thinking – unlike what Perry anticipated in his model – seemed peripheral as it had not been discussed much. Therefore, it seemed necessary to delve deeper and elicit why the developmental trends of this study's groups tend not to match the one anticipated by Perry. Opportunities arose for a close up investigation by conducting group discussions and semi-structured interviews with Egyptian and Scottish students in the first and final year of their degree, details of which are described next.

9.2.1 Group Discussions with the Egyptian Undergraduates

Of the Egyptian undergraduates who completed the questionnaire and agreed to participate by providing their contact details, students in their first and final year of the degree were approached. About 96 students were approached of whom 71 were interviewed, 30 first year students and 41 final year students. Interviews* took place in the form of group discussions each involving 10 or 11 students. Groups of this number are considered appropriate for the following reasons. They suited the purpose of this phase (i.e. get an overall collective view of students' perceptions of their university education). They created a permissive atmosphere where students were able to reflect on their experiences, speak up their mind and criticise what is perceived as 'the authority figure'.

A semi-structured interview schedule with open questions generally guided by some of the six dimensions and by students' perceptions and expectations of university life and education was chosen mainly to encourage students to unreservedly express their perceptions of the university experience in general and teacher training courses in particular (Appendix 9.1). Notes were taken as the discussion took place. After obtaining students' approval, some discussions were tape-recorded.

The purpose of these interviews was twofold: first, to validate the results gained from the questionnaire; and second, to obtain through their perceptions of their university education an insight into the reasons underpinning students' observed pattern.

From these discussions, it is clear that the entering beliefs of pre-service teachers were mostly positive and congruent with 'Perry C' thinking confirming the data gained from the questionnaire. However, this seemed to be an expression of confidence, motivation and aspiration. Students were confident in their academic ability for getting this far in their education. Mostly (though not true of all) their sense of helping children and improving

* More about using interviews as a research method is provided in the next chapter.

teaching practices were strong motivators for their decision of choosing this degree. When asked about their expectations from university life and education, students stressed its being 'different from school' factor as the most important thing. When explored, students expressed expectations of University life and formal teacher training which were in great alignment with 'Perry C' thinking.

Entering pre-service teachers believed that *personally* they expect to be offered opportunities to develop their personality, confidence, and to gain more awareness of themselves and others for better communication and healthy relationships. *Academically*, they believed that they are going to gain vast and deep content and pedagogical knowledge and experiences that are strongly linked to real-life situations in general and their school teaching career in particular. So often the point of being able to solve real-life problem was accentuated. In the process of learning, they anticipated more freedom: not being bound by school textbook but rather being allowed to search and research using different sources (library resources). They expected to be treated as independent, critical individuals who have the right to discuss and question whatever they engage with, not relying totally on the lecturer. They perceived the atmosphere of university learning environment to be built on equal relationship in which what counts is not who you are but how you think. Also they stressed 'commitment' from the involved parts (basically named as lecturers and students) as an essential aspect in the process of achieving these goals.

It was clear that by the end of their degree students realised that these portrayed images are 'unrealistically optimistic'. Inconsistent with the questionnaire's findings, when interviewed, students in their final year expressed views of education that are mostly congruent with the dualistic, objectivist 'Perry A' thinking (reasons that explain this inconsistency are discussed later in this section). As put by students, *academically* university learning is perceived as a one-way communication, students are passive receivers, basically in the form of lecturing, content is mostly limited to the textbooks or notes offered by lecturers, exams are based on memorising the information they include, content knowledge is mostly theoretical, "*brain stuffing*", hardly echoes real-life situations, and of little use – (pedagogical educational subjects mostly), exams are about the quantity of what you produce, and quality is defined in terms of how clever the student is in depicting the information as much as possible similar to how the lecturer put it or prefers it to be put. *Personal* development was not included in their discussions. When raised, interestingly, students replied using the word 'constrains' expressing how their experiences were. Their sense of personal development was quite linked to exams and their results as the major impetus for their self-efficacy and self-esteem.

All through the discussions, final year students made their views clear with a strong sense of lacked motivation, of desperation and disappointment. Fingers of blame were pointing everywhere: system, lecturers, curricula, current methods of teaching, and exams. Even their personal commitment was put in question. In their discussion students, occasionally, acknowledged individual efforts and recent pursuits of reformation in a number of courses. When their perceptions of these courses were explored further, interestingly using dualistic

thinking descriptors, some interpreted them as lecturers "*seeking their peace of mind*", "*not doing their job properly*", and "*lifting the burden from their shoulders to be placed on ours* [students]". However, some of them were quite aware of the problem, one put it beautifully saying, "*I don't know (emm). Those lecturers are trying to wear us out. They ask us to do many things that we don't have the capacity to. No. I think this fecklessness may be all from our part! It is just because we've never been used to this way of teaching before*".

A point well made of what can be called 'learned helplessness' (Seligman, 1975). It might be that initially the university courses – in an attempt to support students – offer too much certainty and structure. Teacher educators may have the belief that students come in at 'Perry A' perspectives and need to be 'weaned off' this dependence before 'upping the challenge' by the final year. However, because students already start with 'Perry C' beliefs, what happens is that teacher educators miss a window of opportunity. Subsequently, what the course does is underchallenge – and as a result disempowers the students.

The responses of final year students also does link back to what other investigators (Al-Shibli, 2003; Selepeng, 2000; Zhang, 2004b) have suggested. Students in their final year are faced with an enormous 'threat' of an unknown future, a prospect of a career that mostly counts on how well students perform in final year exams as well as social and parental expectations they want to meet. In a '*fight* or *flight*' (Cannon, 1914) situation like this, most students are more inclined not to take risks and opt for the 'flight' response. It proved – from their school and university experiences so far – safer and would guarantee success.

The practical implication of this is that, if change is to be introduced, it is better to start as early as possible when at least students have the appropriate dispositions. It is also preferable to have a vision of this reform shared amongst teacher educators so that students may realise that these are – as they expected – the rules of the university education game.

9.2.2 Interviews with the Scottish Undergraduates

In the Scottish context about 25 students were approached for interviewing of whom only 3 students turned up. While the numbers involved in the follow up discussion were fewer in Scotland (1 first year student and 2 final year students) their contributions largely confirm the findings obtained from the questionnaire and offer some insight into why particular positions were held.

Interestingly enough, the only participant from BEd 1 revealed many aspects of 'Perry A' thinking confirming his questionnaire responses. His expressed views are clearly in favour of a learning environment that is mostly structured by lecturers and of exams being quite linked to what is taught on the course. From interviewing two BEd 4 students, it was clear that both students expressed a 'Perry C' thinking generally matching their questionnaire responses. Moreover, both students were very articulate in expressing their theories of learning and teaching: so often did they use terms like "*formative and summative*

assessment", "*constructivism*", "*motivating students*" and "*cooperative learning*". In their conversation, they also quoted theorist, theories and articles. Unlike their Egyptian counterparts, the two Scottish participants seemed able to express their thoughts using 'scientific formal language' not a 'colloquial spontaneous' one. Students expressed their desires and intentions to teach in ways that are congruent with 'Perry C' thinking. Interestingly, they spoke of being mostly taught in what can be called 'Perry A' traditional classes and expressed feelings of restlessness in having to learn in environments different from that. They thought that 'Perry C' classes would be "*very demanding*" and "*require much time and preparation*". One student spoke of activities involving peers saying, "*I don't feel comfortable with them* [these activities]... *Sometimes you don't get much out of them anyway... Some of my colleagues find them interesting but I find them irrelevant... not sure everyone would agree with me but I am not quite 100% sure it is. This may be because my style does not quite match this sort of things... I prefer doing things on my own...I've been quite used to this most of my life anyway* ". Another students talked about assessment saying, "*sitting here now...I would say that what I definitely prefer in assessment is ...from the faculty to be so clear about it...this is what you're going to be assessed on and this is the criteria...I need to know what is expected and just get through it...in here we don't know the criteria again and again and again which come from the faculty ...exams are scary... you're never comfortable with assessment*". Such a perspective highlights the dilemma that exists between 'reality' and 'idealism', 'practice' and 'theory' and between students 'aspirations' and 'actions'.

Given the small numbers who took part in the follow-up discussions from the Scottish sample, the focus of the interpretations to follow is mostly drawn from the discussions conducted with the Egyptian groups.

9.2.3 Possible Interpretations

From the follow-up investigations conducted in this study, it can be argued that the common underpinning explanation of why students respond the way they do in the first and final year of their degree is in essence a reflection of students' '*aspiration* vs. *reality*' complex; of '*how they expect things to be*' and '*how things turned out to be*'.

Moreover, this '*aspiration* vs. *reality*' interpretation seems to explain the discrepancies detected between Egyptian students' questionnaire responses and interview data. As the Egyptian students – in the final year of their degree – expressed through many issues of the questionnaire congruence of their beliefs with 'Perry C' thinking, this 'Perry C' thinking was not revealed through the conducted group discussions.

Two possible scenarios can explain this contradiction. The first is that students – in their responses – are responding from how they would like things to be expressing the aspiration aspect of their experience, yet not as strongly as it used to be. The second scenario is that students are responding in what they think is desirable and would be favoured by their lecturers.

This latter interpretation is driven from similar work conducted by Shipman (1967a; 1967b). In his study, Shipman followed successive groups of education students through their three-year university degree and utilised a combination of questionnaires, interviews and groups discussions to assess changes in educational attitudes. He also detected similar patterns of change which he and Zeichner & Tabachnick (1981) called the 'progressive-traditional' shift. Faced with apparent contradictions between data gathered from students' responses to the questionnaire and the accounts of their interviews and group discussions, he found out that while students responded to the questionnaire in the expected way, students expressed opinions in their interviews that were more in line with the traditional perspectives found in the colleges. Probing the reasons behind these discrepancies led Shipman to conclude that the progressivism, which has been noted, among university students does not represent the impact of the college but is merely a layer imposed to desirably coat basically traditional perspectives that remain latent and intact throughout professional training. He goes as far to state that "students maintained two levels of professional attitudes, one for official use on stage, and one for use backstage, out of official hearing, or later on in the classroom" (Shipman, 1967a, p. 55).

Shipman (1967a) claims that the so-called 'impression management' by students in their responses to questionnaires enable them to insulate themselves from the influence of the college and provides evidence for the low impact of professional training. He believes that once their need for impression management disappears, students discard the progressive perspectives and retain the traditional perspectives that they enter with. Such interpretation stresses the low impact of teachers' formal training supporting a line of argument initiated by Lortie (1975), discussed earlier in chapter three. It also seems to cast doubt on the use of questionnaires alone in measuring attitudes and emphasises the need to use more that one approach in probing any attitudinal issue of interest.

Collectively, this argument along with the previous possible explanations offered by other investigators (Al-Shibli, 2003; Selepeng, 2000; Zhang, 2004b) portrays a picture of the possible catalysts that seem to induce these responses.

, as cited in Knefelkamp, 1999, p. xii

Whether Shipman's plausible explanation is true of the Egyptian and the Scottish samples or not, ultimately the apparent thing these discussions revealed is a serious need for teacher educators to consider a renewal of the academic community through greater understanding of students: a change that need to be systematically and collectively approached. The first step towards that might be adopting Perry's ears and listening to students, reading between the lines, when they struggle to articulate what they mean. When students are their 'common purpose', teacher educators would attempt to find innovative ways to assess their needs, understand them, and to discover new approaches to teaching and learning. As Knefelkamp (1999, p. xii) quotes in her introduction to Perry's (1999) book him saying "A fundamental belief in students is more important than anything else. This fundamental belief is not a sentimental matter: it is a very demanding matter of realistically conceiving

the student where he or she is and at the same time never losing sight of where he or she can be": a challenge not easily met. As a matter of fact, the interviewed Egyptian students communicated this need strongly through their gratefulness for getting the opportunity to voice their thoughts through these discussions.

9.3 Postgraduates' Beliefs

Another purpose of this phase of the study is to ascertain how the educational beliefs of undergraduate student teachers compare with those of postgraduate student teachers. The issue of interest, here, is to explore if postgraduates would hold a different belief framework from that held by undergraduates as a result of them coming to the teaching profession from a different route.

Perry's (1970) original study was conducted with university students who are not necessarily student teachers. Having been through a degree as such, the following hypotheses are made.

Hypothesis 1: Postgraduates hold sophisticated relativistic 'Perry C' type of thinking.

Hypothesis 2: Postgraduates' pattern of development would be similar to that of undergraduates in the final year of their degree.

From data analysis, both hypotheses are strongly supported in both the Egyptian and the Scottish contexts as postgraduates – respectively in almost 74% and 78% of the questionnaire's items – responded with 'Perry C' congruent beliefs. Moreover, according to the conducted statistical analysis, postgraduates' different route into teaching seems not to result in much different belief profile than that of undergraduates in year 4. In most issues, Egyptian and Scottish postgraduates' beliefs seem not to significantly differ from undergraduates' beliefs in their final year (respectively in almost 78% and 59% of the questionnaire's issues).

As the study of the educational beliefs of those who enter teaching by a non-educational degree route is a relatively new interest of research, some studies were conducted to investigate what strongly affects postgraduate students' theories of teaching and learning. Interestingly, findings from these studies (Crow, Levine, & Nager, 1990; Novak & Knowles, 1992; Powell & Birrell, 1992) seem to support that, while traditional students' beliefs were strongly related to their former schooling experiences, postgraduate pre-service teachers' beliefs are grounded in their life and past occupational experiences (if they have any). Moreover, a study conducted by Kile (1993) revealed that they appear to understand the complexities of teaching and learning more than traditional students do, and that their approach to teaching is more aligned with the progressive constructive approach than that of traditional students (Clift, 1987).

These findings seem to explain the patterns observed in the current study. Postgraduates – particularly in the Egyptian context – have formed the highest 'Perry C' population and/or the least 'Perry A' in many issues across most dimensions compared to all groups.

Moreover, they – unlike undergraduates in year 4 – revealed a strong degree of confidence as they markedly went for the extreme and radical positions of (C6) and/or (C5) in most of the cases: a confidence that seems to be gained from their successful academic experience achieved through their first degree as well as the rich life and work experiences they may have been through. This, yet again, questions the nature and effect of formal pedagogical teacher training courses. Full discussion of that is presented in chapter three.

From the data analysis presented earlier, it can be concluded that postgraduates' developmental pattern – of both the Egyptian and the Scottish contexts – is in congruence with Perry's anticipated one.

9.4 Teachers' Beliefs

This phase of the study aimed as well at investigating the educational beliefs of practicing teachers compared with those held by pre-service teachers.

Teachers are assumed to be in 'Committed to Relativism' position. Considering the hierarchical nature of development in Perry's model, this position transcends and subsumes relativism. The following hypotheses are, therefore, made.

Hypothesis 1: Teachers hold sophisticated relativistic 'Perry C' type of thinking.

Hypothesis 2: Compared to all other groups, teachers' beliefs are in most congruence with 'Perry C' thinking.

Data analysis of the Egyptian and the Scottish teachers groups supports the first hypothesis. Teachers in respectively 74% and 89% of the questionnaires issues responded with 'Perry C' beliefs.

As to the second hypothesis, statistical analysis has revealed that while Scottish teachers significantly form the highest 'Perry C' thinking in about 78% of the questionnaire's issues compared to all other groups, Egyptian teachers' beliefs pattern is quite the reverse. While the majority of the Egyptian teachers held 'Perry C' positions on the issues covered by the questionnaire, these were consistently the smallest percentage of 'Perry C' thinkers compared to the undergraduate groups in their first and final year of the degree and the postgraduate group. In almost 80% of the questionnaire's issues, they significantly reverted back to 'Perry A' and 'Perry B' thinking forming the highest percentage on both positions of all groups.

This particular contrast has stimulated further investigations upon which the rest of this project is built. These explorations will be presented and discussed in the following chapters.

9.5 Cultural Generalisability of the Development of Beliefs

The final point of interest of this phase of the study is to examine the cross-cultural generalisability of Perry's (1970) theory of intellectual and ethical development across both cultures, the Egyptian and the Scottish.

Common to all *cognitive-structural* theories is the concept of universal and transcultural cognitive stages. To this, the positions conceptualised in Perry's theory of intellectual and ethical development are no exception (Chapter five). Therefore, the following hypothesis is made.

Hypothesis 1: Perry's hypothesised pattern of development is generally identified in both the Egyptian and Scottish cultures.

The analysis stemming from the three-way triadic comparisons of the undergraduate, postgraduate, and teachers groups of each cultural context presented so far does not support this hypothesis. As mentioned earlier, research evidence from other studies (Al-Shibli, 2003; Selepeng, 2000; Zhang, 2004b) seems to support the finding of this study – particular to the undergraduates groups. However, there has been little research conducted using Perry's scheme on groups that go beyond the university degree.

Two questions of great importance are raised in attempt to make sense of these cross-culturally observed patterns that deviate from Perry's model. First, would these findings cast doubt on the suitability of using Perry's original model of 'dualism – multiplicity – relativism' developmental sequence to describe the cognitive development of university students or the development of individuals beyond university degree? Second, would the variance from Perry's model noticed in these cognitive-developmental patterns across cultures be the effect of cultural and educational dimensions that seem commonly to underpin these cultures?

Although there is a clear paucity in the literature of studies that aim to examine the cross-cultural aspect of beliefs in general and epistemological beliefs in particular, the existing evidence seems to back up the latter issue as the interpretation of the common pattern noticed among these studies that is inconsistent with Perry's anticipated one.

Theoretically, this is sustained by the emphasis cognitive-structural theories – which subsume Perry's theory – place on the interaction between both the individual and the environment as a necessity for development to take place.

Empirically, Tasaki (2001) investigated the cultural influences on patterns of epistemological beliefs (as measured by Schommer's Epistemological Questionnaire) of East Asian Americans and East Asian international students. The finding of this study confirms that there is a distinct effect of "culturally conditioned self-construal" (how culture shapes self-concepts and determines their thoughts, feelings and actions) on epistemological beliefs. The interdependent self-construal (unbounded, flexible, and contingent on social context) of East Asian cultural values appear to promote beliefs such

as knowledge is certain and handed down from authorities. Beliefs that learning is a rigid process and that only talented students can be successful in the learning process also seem to be cultivated by East Asian cultural orientations. On the other hand, Western cultural values indicated by the independent self-construal (bounded, unitary, stable, self-separated from social context) may encourage students to develop the beliefs such as knowledge is uncertain and is acquired through reasoning. The research evidence Tasaki's study provides is supported by more recent work conducted by Marrs (2005). Both studies empirically emphasise the interactionist view of development as a possible interpretation of the inconsistencies found.

The fact that a similar pattern – that is different from Perry's – has been identified in both Western Scottish and Middle Eastern Egyptian undergraduate groups as well as other Non-Western groups may as well be partially explained by the global acculturation of the perception that 'Perry C' beliefs are becoming more known to be universally valued especially in higher education and in psychological and educational literature. Participants of whatever culture, therefore, may be more inclined to choose items aligned with 'Perry C' relativistic thinking reflecting what mentioned earlier of the 'aspiration vs. reality' complex and 'impression management' technique.

Another aspect that may partially explain this is the problematic nature of studying beliefs as a fluctuating, complex system that can accommodate two contradictory beliefs at the same time without causing any conflicts. Common to all these studies is the use of research methodologies that are solely quantitative using paper-and-pencil inventories. A mixed method approach using quantitative measures (such as questionnaire) coupled with qualitative means (such as interviews) would be necessary to reveal the complexities of beliefs.

It can now be concluded that to a great extent culture and acculturation seem to affect individual's beliefs. Moreover, the Egyptian and Scottish contexts seem not to provide the exact ideal liberal progressive learning environments that Harvard University provided to Perry's sampled groups in his original study. Therefore, the cross-cultural generalisability of Perry's model is questioned in fitting the different cultural groups participated in the current study.

9.6 Issues for Discussion

The discussion of the findings presented so far raise two issues of great importance. The first of which is that although Nespor's (1987) and Pajares' (1992) reviews on beliefs concluded that attempts of belief change in teacher education and teacher professional development proved beliefs to be generally static and enduring, unaltered and resistant to change, in the current study the findings do not support this hypothesis. Beliefs do indeed seem to change even though change was not necessarily or precisely as has been prescribed by Perry's model. Moreover, it occurs across different cultures. Students come to

university holding a prior set of beliefs or expectations that do not remain static throughout the university experience.

The second issue has to do with the factors and influences that facilitate this belief change. Put in other words, is the noticed change simply the outcome of the experience of being a student that naturally lends itself to the adoption of the 'Perry C' position or is it that university courses, in general, and teacher education courses, in particular, themselves that deliberately seek to nurture 'Perry C' type of thinking?

In considering this issue, it is important to note that both factors are closely integrated in building up students' university experience as a whole that it would be difficult to draw a line as to which of them has what influence on students' development. Nevertheless, Perry (1970) has discerned his model from students' perceptions in trying to making sense of their university experiences regardless of the type of courses they were offered. He also validated his model by the fact that anyone who reads it can relate to it from his/her personal university experiences. Findings from this study with the postgraduate group holding 'Perry C' views that are either statistically no different or statistically more significant than undergraduates in both cultural contexts, Egypt and Scotland, seem to question the effect of teacher training programs and add weight to the argument that experience does override taught courses. The nature and effect of formal pedagogical training on belief change have been for so long put to question. Full discussion of that is presented earlier. Similarly, the results gained from the Egyptian teachers group seem to confirm this argument suggesting that the effects of university teacher education are 'washed out' by school experience. Further investigations would be useful in illuminating the picture more with tangible evidences rather than mere speculations.

9.7 Conclusion

This chapter aimed at providing explanations, investigations and interpretations of the consistencies and inconsistencies the analysis of the Egyptian and the Scottish data has revealed with Perry's pattern of development.

Group discussions and interviews were conducted with the undergraduate groups to both validate their responses on the questionnaire and to gain an understanding of the reasons behind the deviation of their observed patterns of development from the one anticipated by Perry. Findings have revealed the responses of the Scottish students (of the first and final year) and the Egyptian students (of the first year) to be highly consistent with their questionnaire responses. Nonetheless, the perceptions of the Egyptian students in their first year were unfold as a reflection of their rhetorical aspirations and expectations of how they would like university experiences to be. The 'Perry A' congruent views of the final year Egyptian students' interview accounts were inconsistent with their questionnaire responses. By probing this more, it was argued that these responses could be either an expression of how they, still, think things should be or merely an impression management as students respond in what they think would be desirable and favoured by their lecturers. Further

reasons behind year four students' observed pattern of responses were suggested in light of the nature of their learning environments and the nature of the stage at which they are.

The consistency of the postgraduate students' responses with Perry's model was discussed in comparison with those of final year undergraduates. Moreover, further issues related to the generalisability of the model were discussed casting doubt on it being transcultural and universal, ultimately, emphasising the interplay between the environment and how development takes place.

The contrast among the Egyptian teachers' pattern of development, their Scottish counterparts, and what was hypothesised using Perry conceptualisations seemed quite interesting to be the focus of further investigation. It raises a number of questions as to the reasons causing this change and the nature of other influential factors that may help either to reinforce or change these belief patterns. All of these issues served as an impetus for further exploration conducted in a number of investigations discussed in the following chapters. The initial step of which was interviewing a sample of the Egyptian teachers. This is discussed in the next two chapters.

Chapter Ten

Research Methodology and methods: Phase Two

10.1 Introduction

This phase of the study examines the belief profile of the Egyptian teachers group. The Egyptian teachers' profile was distinctively different from the developmental pattern predicted by Perry (1970) and their Scottish counterparts. Indeed, the Egyptian teacher group – in comparison to all other groups – revealed a preference for the reductionist dualistic 'Perry A' and the multiplist 'Perry B' thinking positions. This phase, therefore, reports on the research undertaken to gain more insight into the Egyptian teachers' mental world. The discussion of this phase is presented in two chapters. The first (herein) deals with the conceptual framework that has informed the choice of research methodologies and methods. It also presents a description of the participating subjects and the procedures used for data analysis. The second chapter (Chapter Eleven) involves the interpretation and discussion of the presented findings.

10.2 The Aims of this Investigation

Indeed the meaning people give to their experience and their process of interpretation is essential and constitutive, not accidental or secondary to what the experience is (Gerth & Mills, 1953), the purpose of this investigation is twofold:

- To examine the consistency between teachers' questionnaire responses and the current interview accounts.
- To go further and deeper into the responses in order to understand better the factors or the reasons behind this group's deviation from Perry's anticipated pattern.

It trying to achieve the latter, it is important to know that the aim of this phase of investigation is to generate as many factors as possible. The identified factors will subsequently be examined in a broader cross-cultural context (Chapter Twelve).

10.3 Research Approach of the Study

A research approach, philosophy or paradigm shapes how people study their world. According to LeCompte and Schensul (1999),"[a] paradigm constitutes a way of looking at the world; interpreting what is seen; and deciding which of the things seen by researchers are real, valid, and important to document. A research philosophy also indicates how research ought to be conducted, by whom, using what means and with what degrees of involvement or dispassion" (p. 41).

This section, therefore, addresses the two dominant research methodologies: the quantitative and the qualitative. It also highlights the paradigmatic differences between them and how the anomalies faced with each have led to the emergence of the new

paradigm of mixed methods research. This discussion is further developed to shed light on the current paradigmatic and methodological stance of the three-phased study as a whole (mixed methods research) and of the current phase in particular (qualitative research).

10.3.1 Qualitative and Quantitative Research: The Methodologies

Qualitative research is a distinct research strategy. In essence, it is believed to reflect a paradigmatic way of perceiving the world and how it, subsequently, should be examined. As has been mentioned before (Chapter Two), a paradigm is basically made up of three components: ontology, epistemology and methodology (Coll & Taylor, 2001; Guba & Lincoln, 1989, 1994). The ontological assumptions of qualitative research has been described as *relativism*[*] or as *constructionist* (Bryman, 2004; Morgan, 2007). This implies that social reality is the outcome of the interactions between individuals. Thus, relativism as an ontological position challenges the belief that reality is a phenomenon that is 'out there' or 'pre-given' and that it could be separated from those involved in its construction. The epistemological stance of it has been described as *constructivism* or occasionally known as *interpretivism* (Bryman, 2004; Morgan, 2007). This stresses the understanding of the social world through the examination of the interpretation of that world as perceived by its participants. As such, the methodological approach of qualitative research is basically *inductive*. An inductive view of the relationship between theory and research implies the former being generated from the latter. Unlike deductive research, a primarily inductive research involves drawing generalisable inferences out of observations without imposing any pre-existing expectations (Figure 10.1). In other words, a theory would be the outcome of the research (Bryman, 2004).

Qualitative research is distinguished from quantitative research. As a research strategy, the latter emphasises quantification in the collection and analysis of data. The fundamental paradigmatic difference between both lies, however, in that the quantitative approach has a *realist* ontological stance. It embodies a view of reality as an external objective one. Moreover, it has incorporated the *objectivist* practices and norms of the natural scientific model and of positivism in particular. It also entails a *deductive* approach to the relationship between theory and research. In primarily deductive research the accent is placed on the testing of theories.

In respect to the relationship between theory and research, it is worth noting that there is always some element of inductiveness in any predominantly deductive research. This is noted when the implications of the research findings feed back into the original theory and the research findings associated with a certain domain of enquiry. Similarly, Bryman (2004) argues that "just as deduction entails an element of induction, the inductive process is likely to entail a modicum of deduction" (p. 10-11) (Figure 10.1). This is manifested in researcher weaving back and forth between data and theory often described as iterative. Once the researcher carries out the theoretical reflection on a set of data, s/he may want to

[*] The rationale behind using these specific terms has been discussed in Chapter Two.

collect further data to establish the conditions in which a theory will or will not hold (Bryman, 2004). This is particularly evident in the grounded theory. More about it is discussed later in this chapter.

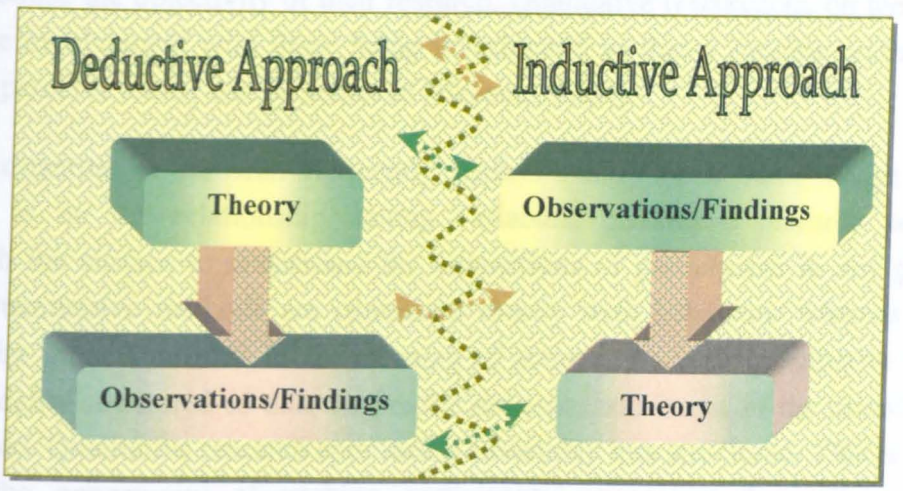


Figure 10.1: Deductive and Inductive Approaches to the Relationship between Theory and Research

The pragmatic differences between both research approaches are presented in the following table (Table 10.1).

	Quantitative	Qualitative
Ontological orientations	Realism	Relativism Constructionism
Epistemological orientation	Objectivism Natural science model in particular Positivism	Constructivism Interpretivism
Methodological orientation (the role of theory in relation to research)	Deductive; testing of theory	Inductive; generation of theory

Table 10. 1: Fundamental Differences between Qualitative and Quantitative Research Strategies

10.3.2 Qualitative and Quantitative Research: The Methods

These fundamentally different positions have held both qualitative and quantitative research as contrasting paradigms. The contrasting differences between qualitative and quantitative methods have been summarised by many researchers (Bryman, 1988a; Halfpenny, 1979; Hammersley, 1989; Taylor et al., 1995). In the following discussion, an attempt to bring out the basic contrasting features of these research methods is presented (Table 10.2).

Qualitative methods can be construed as a research strategy that usually emphasises words in the presentation of the analyses of reality whereas quantitative researchers are preoccupied with applying measurements to understand the social reality. Moreover, in quantitative research, the set of concerns the researcher brings to an investigation

structures it. In qualitative research the accounts, perspectives and interpretations of those being studied are what provide the research orientation. In contrast it is common, and sometimes desirable, for quantitative researchers to be uninvolved with their subjects not to compromise the objectivity of their research. Qualitative researchers, on the other hand, seek close involvement with those being investigated so that a genuine understanding of how they perceive reality can be achieved (Bryman, 2004).

Whereas quantitative research frequently depicts reality as a static image where the emphasis is on the relationship among variables, qualitative research seeks to go underneath the surface to understand the interactions of participants in any given social setting. Quantitative methods are concerned mostly with behaviour whereas qualitative methods are more interested in the meaning of actions. As such quantitative research is typically highly structured so that the precise concepts and issues of the investigation can be examined. Qualitative research approach is invariably less structured. This is believed to enhance the opportunity of probing participants' meanings. Typically, quantitative researchers would, therefore, conduct research in a controlled setting whereas qualitative researcher would seek to investigate participants in their natural settings (Bryman, 2004).

Furthermore, quantitative research is often depicted as useful in uncovering large-scale trends and connections between variables aiming thus at generalising the findings. In contrast, qualitative research is commonly depicted as useful in uncovering small-scale aspects of social reality with the ultimate goal of understanding the perceptions, behaviours, values, and beliefs of the participants in the context of the research conducted (Bryman, 2004). Another common difference between them is highlighted in the type of data they provide. Whereas quantitative data is often considered robust and unambiguous due to the precision of the used measurements, qualitative data is often depicted as rich and deep provided by the prolonged involvement with the participants (Bryman, 2004).

Quantitative	Qualitative
Numbers	Words
Point of view of researcher	Point of view of participant
Researcher distant	Researcher close
Theory testing	Theory emergent
Static	Process
Structured	Unstructured
Generalization	Contextual understanding
Hard, reliable data	Rich, deep data
Macro	Micro
Behaviour	Meaning
Artificial settings	Natural settings

Table 10.2: Some Contrasts between Qualitative and Quantitative Research

Extracted from (Bryman, 2004)

10.3.3 Paradigm Wars of Quantitative and Qualitative Research

The distinction between qualitative and quantitative research has been the focus of much of the discussion on research methodologies for the past two decades (Morgan, 2007). The ontological and epistemological underpinning assumptions have turned both approaches into two competing or "almost warring" camps (Seidman, 1998, p. 2). From a Kuhnian* perspective (Kuhn, 1970), the debate between the two camps represents a typical 'case study' of a paradigm change.

Indeed, the 'realist paradigm' has been the "normal science" (Kuhn, 1970) for many centuries. Its basic beliefs had formed a shared theoretical framework and a working model that governed scholars' activities in any area of inquiry. Not only did it define what should be the compelling set of researchable questions but also it supplied the practitioners with the tools, methodologies and premises. The use of quantitative research methods has been associated with this paradigm. In that respect, quantitative research has maintained the broader dominance from the 1960s until the 1980s (Morgan, 2007; Seidman, 1998).

In education, the implications of this paradigmatic dominance has been that '[f]or many years those who were trying to make education a respectable academic discipline in universities argued that education could be a science" (Seidman, 1998, p. 1). This has advocated adopting research models that are patterned after those in the natural and physical sciences (Bailyn, 1963). A reaction to the dominance of experimental, quantitative and behaviourist research in education began to develop in the 1970s (Gage, 1963). The outcome was drawing attention to qualitative research and methods.

The most fundamental "anomalies" (Kuhn, 1970) faced with the 'realist paradigm' centred around the viewpoint that "human affairs simply cannot be studied with the scientific methods used to study the natural world" (Gage, 1963, p. 4). This is because, first, there is a great difference between the subjects of inquiry in the natural and social sciences. The subjects of inquiry in the social sciences can talk and think. Therefore, unlike a chemical or a planet, "if given a chance to talk freely, people appear to know a lot about what is going on" (Bertaux, 1981, p. 39). Second, human affairs, including teaching and learning are inextricably involved with the intentions, goals and purposes that give them meaning. Third, natural sciences are involved with direct, one-way casual links, but there are no such simple casual connections between teacher's behaviours and student's learning. Fourth, scientific methods can be applied only to natural phenomena that are stable across time, space and context in a way obviously untrue of the human world of teaching and learning. Critics therefore asserted that "we should not search for the kind of prediction and control that scientific methods might yield but rather for the kind of insight that historians, moral philosophers, novelists, artists, and literary critics can provide" (Gage, 1963, p. 4).

* This has been discussed previously in Chapter Two.

For Kuhn (1970), "anomalies" were essentially empirical concerns that consisted of either failed predictions from the existing paradigm or new observations that were incompatible with that paradigm. Either of these sources could create an increasing sense of dissatisfaction with the dominant paradigm that would eventually lead to the emergence of a new one. In addition to the anomalies discussed above, there were claims of things that quantitative research could not accomplish which would be possible through qualitative research. Nonetheless, Morgan (2007) argues that advocates of qualitative research

> did not use the classic emphasis on anomalies as the centrepiece of their attack on the positivist paradigm... the core of the debate was pitched at a much more abstract level, based on concerns from the philosophy of knowledge... Questioning the dominant paradigm at the level of fundamental assumptions rather than focusing on empirical anomalies enhanced the legitimacy of Qualitative Research through a reinterpretation of basic methodological issues in the social science. (p. 57)

Indeed, a "paradigm shift" has been the outcome of the "paradigm debate" between the two camps that gets especially fierce and more extreme when metaphysical and philosophical differences are considered. The underlying ontological assumptions about the nature of reality and the epistemological assumptions about the relationship between the knower and the known inherent in each approach are different and, to a considerable degree, contradictory. This has led to a "paradigmatic shift" (Kuhn, 1970) noticed in the renewed interest in qualitative research from 1980 through 2000. This, indeed, has been considered as one of if not *the* biggest shifts in research methods (Denzin & Lincoln, 1994; Morgan, 1998b, 2007). This has been evident in the tendency for recent textbooks on research methods to increasingly provide a balanced coverage of both quantitative and qualitative research compared to previous editions of the same text (e.g., Babbie, 1992, 1995, 2004). Indeed, the movement of qualitative research from a relatively marginal position to essential equality with quantitative research amounts to a clear shift in the historical pattern (Morgan, 1998b, 2007). This is particularly interesting since Kuhn (1970) suggested that the incorporation into textbooks is one of the hallmarks for a successful paradigm. Moreover, Morgan (2007) points out, "if discussion of ontology, epistemology, and methodology have become central elements in the instruction of the next generation of researchers, that would be clear evidence for the increasing dominance of the belief system associated with the metaphysical paradigms" (p. 59).

Under this new paradigm, the key questions for research methodologists shifted towards a focus on differences in the underlying philosophical assumptions associated with different ways of doing research. It endorsed the view that research methods are essentially rooted in ontological and epistemological commitments. Such a view can be discerned in statements like Hughes' (1990)

> Every research tool or procedure is inextricably embedded in commitments to particular versions of the world and to knowing that world. To use a questionnaire, to use an attitude scale, to take the role of participant observer, to select a random sample, to measure rates of population growth, and so on, is

> to be involved in conceptions of the world which allow these instruments to be used for the purposes conceived. (p. 11)

The appropriate means for addressing these issues introduced concepts from the philosophy of knowledge that seldom appeared in earlier discussions of social sciences and educational research. This indeed marks one of the major strength of this new paradigm described by Morgan (2007) as the 'metaphysical paradigm'. Another advantage this paradigm has offered is that it legitimatised the existence of alternative ways of believing. This has led to major changes in methodologists' thinking about both the kinds of problems that were most meaningful for inquiry and the means preferred for answering the emergent questions.

Qualitative research has offered invaluable contributions to research methodologies. Nonetheless, there are *two* important issues or rather "anomalies" (Kuhn, 1970) associated with it. The first is that this 'metaphysical' paradigm was mostly absorbed with abstract discussions about philosophical assumptions with little attention to how those choices influence the practical 'how-to' decisions being made by practising researchers. This has indeed created the "odd disconnect" (Morgan, 2007, p. 63) between philosophical and practical issues associated with the use of its methods. This concern is encapsulated in the following question "to what extent do such philosophical assumptions guide the practical decisions of conducting research?" (Morgan, 2007, p. 63). This dilemma is alluded to Guba and Lincoln's (1994) footnote to their chapter in the first edition of the *Handbook on Qualitative Research*:

> It is unlikely that a practitioner of any paradigm would agree that our summaries closely describe what he or she thinks or does. Workaday scientists rarely have either the time or the inclination to assess what they do in philosophical terms. We do contend, however, that these descriptions [of paradigms] are apt as broad brush stokes, if not at the individual level. (p. 117)

However, this tentative balance of the role of paradigms does contrast with their view strongly expressed at the final sentence of the same chapter, that:

> Paradigm issues are crucial; no inquirer, we maintain, ought to go about the business of inquiry without being clear about just what paradigm informs and guides his or her approach. (p. 116)

The second issue concerns the 'incommensurability' (Kuhn, 1970), also known as the 'incompatibility thesis' (Smith & Heshusius, 1986), of knowledge accentuated by the differences between both paradigms. Because the metaphysical paradigm adopted a strong stance with regard to incommensurability, it suggests that by accepting one paradigm the researcher is to reject all the others. However, since there is no clear defined boundaries that separate one paradigm from the other, Morgan (2007) believes that this argument does not make much sense stating that "Despite the metaphysical paradigm's insistence that different paradigms create 'incommensurable' kinds of knowledge, attempts to use this

strong version of incommensurability repeatedly fails at every level except for debates about the nature of reality and truth" (p. 64). This kind of view has led the advocates of this paradigm (e.g. Smith, 1983; Smith & Heshusius, 1986) to argue that multi-strategy research is not feasible or even desirable. Using, for example, a questionnaire when participant observation is not amenable is perceived as an unfounded assumption (Bryman, 2004). Such integration, they believe, ignores the irreconcilable views about how social reality should be studied. The difficulty of such arguments is that its practical implications are very difficult to sustain (Bryman, 1988a).

It is important to note that the emergence of the new paradigm does not imply that the majority of researchers have stopped using the old paradigm, nor does it mean that larger numbers of practicing researchers have shifted from quantitative to qualitative research. Many researchers have used a mixture of both methods, irrespective of their paradigmatic allegiances. Indeed, there has been an increasing interest in combining qualitative and quantitative methods that has led to calls for greater clarity about the linkage between these 'top-down', ontology-driven and philosophical commitments at the paradigm level and practical procedures at the level of data collection and analysis. This has led to calls for 'de-kuhnifying' (Shadish, 1995) the debate about quantitative and qualitative research so that researchers can have more freedom to use what best suits their research questions. Others, however, have called for 're-kuhnifying' the debate (Morgan, 2007). In that sense, there are claims that a new 'paradigmatic shift' is currently taking place (e.g. Brewer & Hunter, 2006; Creswell, 2003; Greene & Caracelli, 1997; Johnson, Onwuegbuzie, & Turner, 2007; Morgan, 2007; Tashakkori & Teddlie, 1998, 2003; Teddlie & Tashakkori, 2006). This currently taking place shift has emerged as a way to resolve the anomalies experienced with the existing paradigm.

10.3.4 The End of Paradigm Wars and the Emergence of Mixed Research

This new paradigm is known as *mixed methods research* (also called *mixed research*). It has a 'bottom-up' foundation as it has started with researchers and methodologists who believed quantitative and qualitative viewpoints are useful in addressing their research questions. It evolved from the recent growing body of research studies that are engaged in the conceptualisation and utilisation of mixed quantitative and qualitative methods. Being in its early stages, some researchers are reluctant to use "the P-word [paradigm]" (Morgan, 2007, p. 65) for labelling this approach. Others, however, have confidently considered it as "becoming increasingly articulated, attached to research practice, and recognized as the third major research approach to *research paradigms*" (Johnson et al., 2007, p. 112). Considering Kuhn's definition of a paradigm as shared beliefs and practices within a community of researchers who share a consensus about which questions are most meaningful and which procedures are most appropriate for answering those questions. This definitely legitimises the use of the paradigm in describing this new approach.

It is interesting to note that in recent years credence to this new paradigm has been given by statements some of the strongest supporters of qualitative research such as Denzin,

Lincoln and Guba have at times given. For instance, Lincoln and Guba (1985) acknowledged that "indeed, there are many opportunities for the naturalistic investigators [of the metaphysical paradigm] to utilize quantitative data – probably more than appreciated" (p. 198-199). Guba and Lincoln (1989) stated, "the information may be quantitative or qualitative. Responsive evaluation does not rule out quantitative modes, as is mistakenly believed by many, but deals with whatever information is responsive to the unresolved claim, concern, or issue" (p. 174). Moreover, Guba and Lincoln (1994) restated that "within each paradigm, mixed methodologies may make perfectly good sense" (p. 200). They also declared that "as we tried to make it clear, the 'argument' arising in social sciences was not about method, although many critics of the new naturalistic, ethnographic, phenomenological, and/or case study approaches assumed it was" (p. 200). This is yet again discussed when they posed and answered the following question:

> It is possible to blend elements of one paradigm into another, so that one is engaging in research that represents the best of both worldview? The answer, from our perspective, has to be a cautious yes. This is especially so if the models share axiomatic elements that are similar, or that resonate strongly between them. (p. 201)

A major goal of this paradigm is to resolve the debate that has been known as 'paradigms war' (e.g. Datta, 1994; Guba & Lincoln, 1994; House, 1994; Rossi, 1994; Seidman, 1998) where the debate moved from the use of methods as merely mechanical or technical issues to questioning perceptions of reality and the nature of research itself. The sheer emergence of this new paradigm signals the end of these wars. Even the most noted '*wrestlers*' (Datta, 1994) or '*warriors*' (Tashakkori & Teddlie, 1998) such as Guba and Lincoln (1994) gave stated that,

> The metaphor of paradigm wars described by (1989) is undoubtedly overdrawn. Describing the altercations of the past decade or two as wars paints the matter as more confrontational than necessary. A resolution of paradigm differences can occur only when a new paradigm emerges that is more informed and sophisticated than any existing one. That is most likely to occur if and when proponents of these several points of view come together to discuss their differences. (p. 116)

Thus, 'mixed research' sets to distinguish between *Qualitative* and *Quantitative Research* as research methodologies – with these terms capitalised – and the more technical ones of *qualitative* and *quantitative methods* (Morgan, 2007). Its major concern, then, is the extent to which combining qualitative and quantitative methods is simply about how we use *methods*, as opposed to raising basic issues about the nature of research *methodology* in the social sciences and education.

In addressing these issues, this paradigm has retained and built upon the valuable contributions of the previous paradigms by respecting fully the wisdom of both viewpoints while also seeking a workable middle ground for many research problems of interest (Johnson et al., 2007; Morgan, 2007). In that respect, mixed methods research is, generally

speaking, a pragmatic approach to knowledge (theory and practice) that attempts to consider multi perspectives, positions, viewpoints and standpoints. As Johnson et al. (2007) put it, "[i]n the history of ideas, new antitheses and syntheses continually develop in response to current theses. Mixed research is a synthesis that includes ideas from qualitative and quantitative research" (p. 113).

It essentially endorses the view that research methods should be more 'free floating' in terms of epistemology and ontology than is often supposed. It builds upon an assumption drawn from the philosophy of knowledge that considers the connections between ontology and epistemology as "loosely coupled" (Giere, 1999; Hacking, 1983, 2000; Zammito, 2004). This is, of course, could be debatable by other schools of thought. In this sense, it is interesting to note that despite the fact that these philosophical debates about the different approaches of viewing the world go back to ancient Western philosophy (Socrates, Plato, Aristotle, Protagoras and Gorgias), the spirit and ramifications of these debates are very much alive today.

Whereas relativism was associated with qualitative research and realism with quantitative research, *pragmatism* is considered as the philosophical position associated with this new 'mixed research' paradigm. Being a well-developed philosophy, pragmatism was considered as the most useful philosophy that would support mixed research to integrate multiple perspectives and approaches. On this Johnson et al. (2007) surmise,

> Pragmatism offers an epistemological justification (i.e., via pragmatic epistemic values or standards) and logic (i.e., use the combination of methods and ideas that helps one best frame, address, and provide tentative answers to one's research question[s]) for mixing approaches and methods. (p. 125)

Morgan (2007) in his *Paradigm Lost and Pragmatism Regained* has discussed the pragmatic philosophical underpinnings of this 'mixed method approach' that is based on William James, George Herbert Mead's 'lines of actions', on John Dewey's 'warranted assertions' and on James and Dewey's 'workability' as the core tenants.

As such, pragmatism rejected the incompatibility thesis. It also claimed that different separate research paradigms can remain separate, but they also can be mixed into another research paradigm (Table 10.3). This viewpoint managed to "redirect our attention to methodological rather than metaphysical concerns" (Morgan, 2007, p. 48) as this quintessentially pragmatic approach focused on the essential role that research questions rather than metaphysical assumptions play in determining the choice of the methods used to collect data.

Paradigm	Positivism	Pragmatism	Constructivism
Methods	Quantitative	Quantitative & Qualitative	Qualitative
Logic	Deductive	Deductive & Inductive	Inductive

Epistemology	Objective point of view Knower and knowing are dualism	Both objective and subjective points of view	Subjective point of view Knower and known are inseparable
Ontology	Realism	Accept external reality. Choose explanations that best produce desired outcomes	Relativism

Table 10.3: Comparisons of the Three Paradigms

Drawn from (Tashakkori & Teddlie, 1998)

This emergence of this methodological paradigm is further accentuated when a qualitative research supporter such as Schwandt (2000; 2006) questions the need for the divisions and differentiation between the existing paradigms. He criticised qualitative research being defined through opposition pointing out that " it is highly questionable whether such a distinction [between qualitative and quantitative research] is any longer meaningful for helping us understand the purpose and means of human inquiry" (Schwandt, 2000, p. 210). He also stated,

> All research is interpretive, and we face a multiplicity of methods that are suitable for different kinds of understandings. So the traditional means of coming to grips with one's identity as a researcher by aligning oneself with a particular set of methods is no longer very useful. If we are to go forward, we need to get rid of that distinction. (p. 210)

Pragmatically oriented mixed research '*pacifists*' (Tashakkori & Teddlie, 1998) agree with Schwandt viewpoint. A typical view is expressed by (Johnson et al., 2007). He states that,

> We agree with Schwandt that the dividing lines between paradigms are "*much* fuzzier" than typically suggested in the literature and that antagonism between paradigms is unproductive. The paradigm warriors also too frequently ignore the presence of many intraparadigmatic differences. At the same time, we still believe that it is useful to identify three research paradigms to signify three general clusters of methodological and philosophical positions. However, these positions are not nearly as "logical" and as distinct as is frequently suggested in the literature. (p. 117)

10.3.5 Mixed Research: The Current State of Affairs

Mixed research has been evident in the work of cultural anthropologists and fieldwork sociologists since the first sixty years of the 20th century (Johnson et al., 2007). Nonetheless, the label "mixed research" has only recently been used. The credit for formalising the practice goes to Campbell and Fiske (1959) who introduced the concept of 'multiple operationalism'. In its origin, the idea of multiple operationalism is about the use of more than one method as part of the validation process. The assumption is that this use "enhances our beliefs that the results are valid and not a methodological artefact" (Bouchard, 1976, p. 268). Though the idea of multiple operationalism is more of a measurement and construct validity technique than an approach research methodology, it closely follow the mixed research paradigm of today (Johnson et al., 2007).

This same idea has extended by Webb, Campbell, Schwartz and Sechrest, (1966) who coined the term 'triangulation' in talking about multiple operationalism. According to Webb et al. (1966),

> Once a proposition has been confirmed by two or more independent measurement processes, the uncertainty of its interpretation is greatly reduced. The most persuasive evidence can come through a triangulation of measurement processes. If a proposition can survive the onslaught of a series of imperfect measures, with all their irrelevant error, confidence should be placed in it. Of course, this confidence is increased by minimizing error in each instrument and by a reasonable belief in the different and divergent effects of the sources of error. (p. 3)

Denzin (1978) was the first to outline four method triangulations (Bryman, 2004; Johnson et al., 2007). The first is concerned with *data triangulation* (manifested in the use of a variety of sources in a study). The second is *investigator triangulation* (referred to when different researchers are used in a study). The third is *theory triangulation* (exemplified by the use of multiple theories or perspectives to interpret the results of a study). The fourth is *methodological triangulation* (demonstrated by the use of multiple methods to study a research problem).

Denzin (1978) went on to distinguish further between *within-methods* (using either multiple quantitative or multiple qualitative methods) and *between-methods* triangulation (involving the use of both quantitative and qualitative methods). In that respect, it is worth noting that he recommends the use of the latter type of triangulation. This is because any "bias inherent in any particular data source, investigators, and particularly method will be cancelled out when used in conjunction with other data sources, investigators, and methods... [and therefore]... the result will be a convergence upon the truth about some social phenomena" (Denzin, 1978, p. 14).

Another classification of the types of triangulation was outlined by Morse (1991): *simultaneous* and *sequential* triangulation. Simultaneous triangulation represents the simultaneous use of qualitative and quantitative methods in the data collection stage, however the interaction between both would only appear in the stage of data interpretation when findings complement one another. Sequential triangulation is utilised when the results of one approach are necessary for planning the next method.

Indeed, other researchers (Bryman, 1988b, 1992, 2004; Morgan, 1998b) have considered the different ways in which mixed research can be used. Hammersley (1996) proposed three approaches to mixed research: *triangulation*, *facilitation* and *complementarity*. Triangulation refers to the use of qualitative research to corroborate quantitative research findings or vice versa. The facilitation approach arises when one research strategy is employed in order to aid using the other research strategy. The complementarity approach occurs when two research strategies are employed in order that different aspects of an investigation can be dovetailed.

Many researchers, therefore, have acknowledged the advantages of triangulation (Bryman, 2004; Johnson et al., 2007). Jick (1979) noted that it allows researchers to be more confident of their results; it stimulates the development of creative ways to collecting data and can lead to thicker, richer data; it can lead to the synthesis or integration of theories; and it can uncover contradictions. Moreover, by virtue of its comprehensiveness, it may serve as the litmus test for competing theories (Johnson et al., 2007).

Triangulation is, for many, what a mixed research approach is all about. It is worth stressing, however, that it is still evolving "and will do so for years to come" (Tashakkori & Creswell, 2007, p. 4). Its definition, conceptual and theoretical principles are very much still open to discussion. It was not until January 2007 that the first issue of a journal devoted to that paradigm came to existence (i.e. Journal of Mixed Methods Research). Many researchers have provided a considerable effort to establish its status and to argue that "we currently are in a three methodological or research worlds, with quantitative, qualitative, and mixed methods research all thriving and coexisting" (Johnson et al., 2007p. 117).

The following discussion therefore focuses on how and why it is adopted in the current study.

10.3.6 Mixed Research as the Methodological Stance of the Current Study

The mixed research approach was adopted as the methodological stance for the current investigation. Johnson et al. (2007), through an examination and synthesis of perceptions of the mixed methods approach by 19 leaders in this field, offer the following general definition:

> Mixed methods research is the type of research in which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inferences techniques) for the broad purposes of breadth and depth of understanding and corroboration. (p. 123)

This definition has informed the design of the current study. As such, it incorporates several overlapping groups of mixed methods research (Figure 10.2). In this figure the area in the centre of the figure moving outwards in both directions is considered in broad terms as where mixed methods research falls. The centre of the continuum represents its strongest pure form.

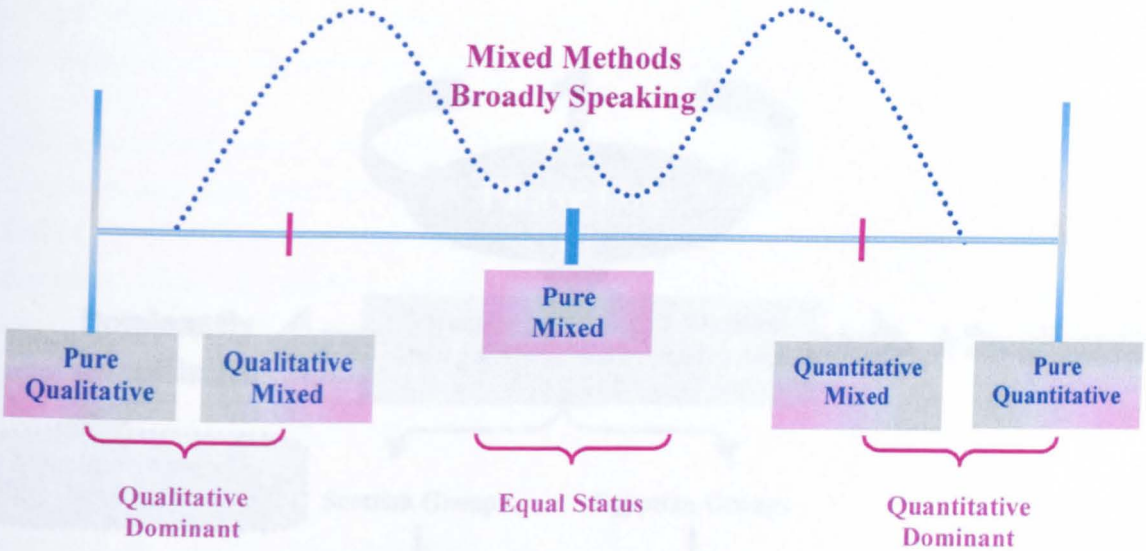


Figure 10.2: The Three Major Research Paradigms, Including Subtypes of Mixed Research

Extracted from (Johnson et al., 2007)

Throughout the *three* phases of the current investigation the mixed research method has been adopted (Figure 10.3). Already the use of quantitative and qualitative approaches has been evident in the first phase of the study (Chapter Seven, Eight and Nine). Though data collection and analysis was predominantly quantitative in phase one, the qualitative approach is evident in two ways. First, the qualitative 'adding up' and evaluation of participants' responses on the various items belonging to the six dimensions of the questionnaire: a process known as "qualitizing" (Tashakkori & Creswell, 2007, p. 125-126) the data. Second, through the sequential use of follow-up group discussions and interviews to both validate the responses obtained from the questionnaire and give more depth and understanding to the findings noticed to inform the process of data interpretation (Figure 10.3).

The second phase of the investigation is predominantly qualitative. The main purpose behind this choice was to allow for the opportunity to dig deeper under the surface in an attempt to understand the underpinning reasons behind the 'odd' pattern noticed with the Egyptian teachers group in particular (compared to Perry's one and to that of their Scottish counterparts). In such a predominantly qualitative phase, an attempt was made to "quantitize" (Tashakkori & Creswell, 2007, p. 19) the emergent themes to provide clearer picture by indicating the number of participants who raised the discussed issues.

Despite the initial attempt of 'quantitising' the data obtained from the interview accounts, it is worth noting that the main aim of the third phase of the study was to complement this attempt by designing an instrument, based on the emergent themes, that would permit further examination of these themes on a larger cross-cultural scale. As such, the

qualitative phase helped with the conceptual and instrument development of the quantitative third phase of the study. More about this will be discussed in chapter twelve.

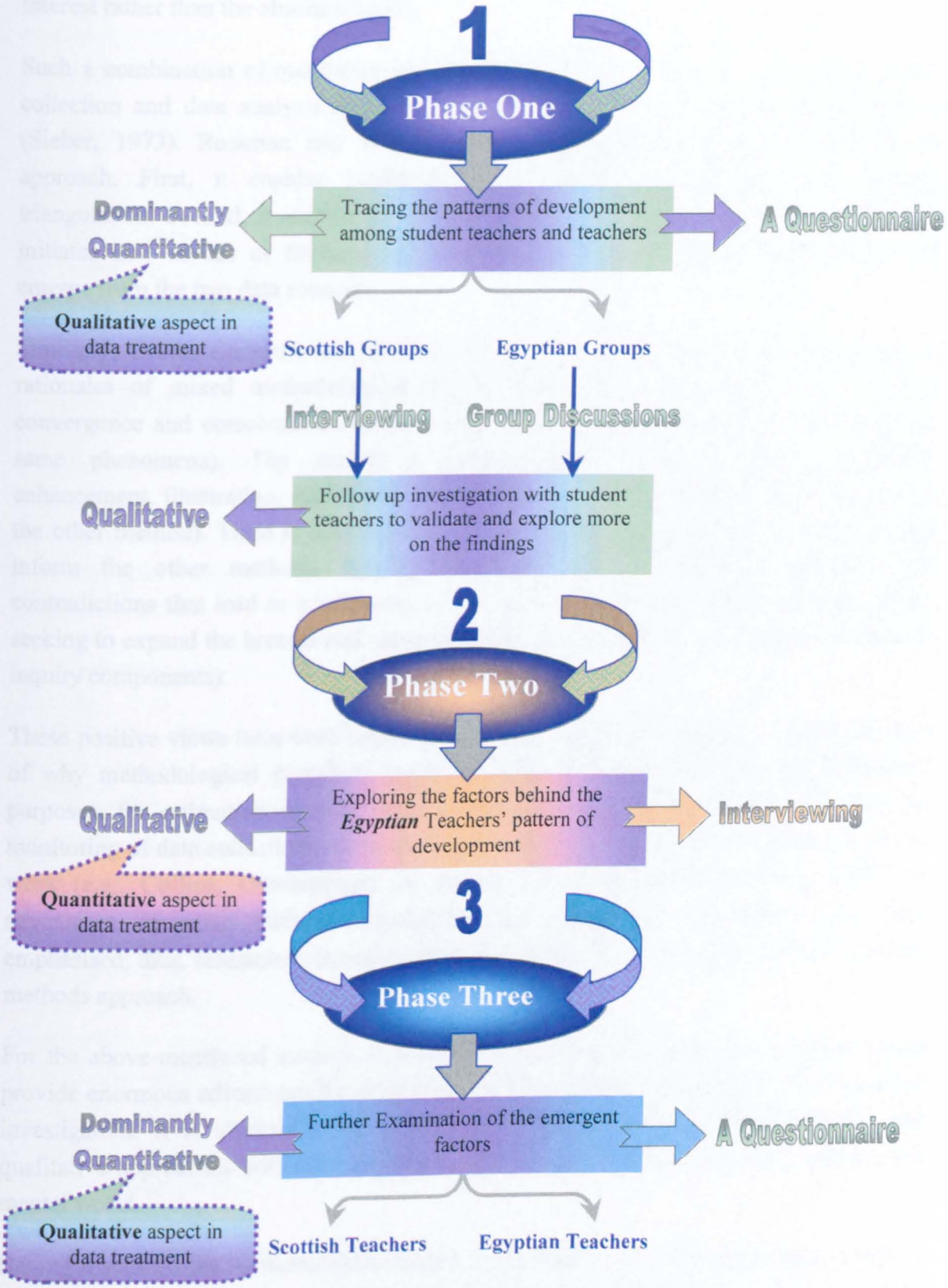


Figure 10.3: Mixed Methods Research as has been Employed in the Current Study

In the quantitatively dominant third phase of the study, data were also 'qualitised' by qualitatively evaluating the responses of each group and by qualitatively comparing the groups' responses with each other. In that sense, the overall patterns of responses were of interest rather than the absolute figures

Such a combination of qualitative and quantitative methods at the research design, data collection and data analysis stages of the research process is believed to be effective (Sieber, 1973). Rossman and Wilson (1985) identified three benefits for using this approach. First, it enables confirmation or corroboration of each other through triangulation. Second, it enables or develops the analysis to provide richer data. Third, it initiates new modes of thinking by attending to paradoxes and/or contradictions that emerge from the two data sources.

Similarly, Green, Caracelli and Graham (1989) have identified five broad purposes or rationales of mixed methodological studies. The first is triangulation (i.e., seeking convergence and corroboration of the results from using different methods to study the same phenomena). The second is complementarity (i.e., seeking elaborations, enhancement, illustration, clarification of the results from one methods with results from the other method). Third is development (i.e., using the results from one method to help inform the other method). Fourth is initiation (i.e., discovering paradoxes and contradictions that lead to a reframing of the research question). Fifth is expansion (i.e., seeking to expand the breadth and range of inquiry by using different methods for different inquiry components).

These positive views have been consistent through Sechrest and Sidana's (1995) accounts of why methodological pluralism could be used. They affirm its use for verification purposes, for estimating possible error in the underlying measures, for facilitating the monitoring of data collection and for probing a data set to determine its meaning. In recent work (e.g., Collins, Onwuegbuzie, & Sutton, 2006; Dzurec & Abraham, 1993) the advantages of using both the qualitative and quantitative approaches have been emphasised; thus, researchers are encouraged *if* possible and convenient to adopt the mixed methods approach.

For the above-mentioned reasons, it was believed that the use of mixed methods would provide enormous advantages for achieving the required breadth and depth for the current investigation. It is ultimately hoped that the juxtaposed use of both quantitative and qualitative approaches will offer an insight into Egyptian teachers' teaching theories and mental world.

Having discussed the methodological stance of the three-phased investigation as a whole, the coming section will focus more specifically on the current qualitative phase providing discussion of issues related to the qualitative research method used.

10.4 Research Method: Phase Two

From the previous discussion, it can be distilled that there are a number of premises relate to the use of qualitative research that make it most appropriate for the purposes of the current investigation. These assertions can be summed up as follow (Ary, Jacobs, Razavieh, & Sorensen, 2006; Bryman, 2004):

- Seeing through the eyes of the people being studied.

Qualitative research expresses a commitment to viewing and interpreting the social world through the eyes of the studied people. It values people's perspectives. It believes that they are capable of forming their own reflections on the social world and that understanding reality is inseparable from considering such reflections. The researchers role then is basically "telling it like it was for them" (Fielding, 1982, p. 83).

- Describing and emphasising the context

Qualitative studies aim for providing detailed and rich descriptions of what goes on in the setting being investigated. These details are of great significance as they provide an account of the context within which people's behaviours take place. The mapping of the context is held important to provide the explanations required to better understand people's frame of reference.

- Emphasising the process

Qualitative research aims at elucidating and understanding the internal dynamics of how different elements of social system interact and interconnect. It seeks to go underneath the surface and beyond the static picture to explore or unfold the various factors and influences that create certain patterns, events or social realities.

- Preferring flexibility and limited structure

Many qualitative researchers are sceptical of research approaches that entail imposing through predetermined formats certain frames of reference on the studies people. Keeping structure to the minimum is believed to limit as much as possible any prior contamination of the social world; thus, enhancing the opportunity to genuinely reveal the perspectives of the studies people. It would also allow for the emergence of some insights from information particularly important to the studied people but may have never crossed the mind of a researcher unacquainted with it.

- Realising that concepts and theory are grounded in data.

As has been described earlier, in qualitative research, concepts and theories are usually arrived at inductively from the data that are collected.

Considering these premises along with the aims of the current investigation (section 10.2), it is clear that a qualitative approach is most appropriate for achieving the purposes of phase two. The focus was on how Egyptian teachers view and understand their teaching world and construct meaning out of their daily experiences. The ain was that, by considering their perspectives in situ (i.e., within their teaching context), the factors or affects that influenced their beliefs to be more reductionist, dualistic and 'Perry A and B' aligned would be elicited.

Having said that, it is important to note that qualitative research subsumes several diverse research methods that differ from each other considerably such as participant observation, qualitative interviewing, focus groups, language-based approaches such as discourse and conversation analysis, the collection of qualitative analysis of texts and documents.

Of these different methods, qualitative interviewing was the method adopted. The debate that there are other avenues that would give access to participants' experiences as effectively as interviewing does and at less cost has been going on for some decades. For instance, whereas Becker and Geer (1957) have been arguing that participant observation is the single and best way to gather data about people in society, Trow (1957) has been arguing back that for some purposes interviewing is far superior. Regarding such a debate, it is important to note that the adequacy of any research method depends on the purpose of the research and the questions being asked (Locke, 1989; Seidman, 1998).

The purpose behind choosing qualitative interviewing or as sometimes called "in-depth" (Seidman, 1998) or "responsive" (Rubin & Rubin, 2005) interviewing is that it is considered as a powerful method that helps to make explicit things that have hitherto been implicit: to help teachers to articulate their tacit perceptions, feelings and understandings (Fielding, 2003). As such, it operates as "night-vision goggles, permitting us to see that which is not ordinarily on view and examine that which is often looked at but seldom seen" (Rubin & Rubin, 2005, p. vii). They were chosen as the methods of the current phase "not to get answers to questions, nor to test hypotheses, and not to 'evaluate' as the term is normally used. At the root of interviewing is an interest in understanding the experience of other people and the meaning they make of that experience" (Seidman, 1998, p. 3). Indeed, at the heart of choosing to use this technique is an interest in listening to Egyptian teachers' worthy stories. As such these stories are considered as an "essentially meaning making process" (Seidman, 1998, p. 1). When they tell their stories, they select details of their experiences to tell, reflect on them, give them meaning and assign to them personal relevance and importance. It is for these processes that telling a story is considered as a meaning-making experience (Schutz, 1970). Indeed, every word they use in telling their story is considered as microcosm of their consciousness (Vygotsky, 1962).

It was hoped that these stories would make it possible to examine how Egyptian teachers' make sense of their teaching world, the context where their beliefs, thoughts, feelings function, how these are interpreted into actions, the relationships among different aspects of their complex world of teaching and how that affects their beliefs and practices. It was

believed that this technique would provide some understandings, explanations and perhaps insights as to why they regressed to be more reductionist and more 'Perry A and B' thinkers (compared to other Egyptian groups, to their Scottish counterpart and to Perry's anticipated pattern of development).

In trying to see the world through their eyes, it is important to recognise the limits of one's ability to understand others. Schutz (1970) states that it is never possible to understand other individuals perfectly, because to do so would mean that an access is granted to their stream of consciousness. If doing so were possible, then we would be that other person. He gives the example of walking in the woods and seeing a man chopping wood. The observer can watch this behaviour and have an 'observational understanding' of the woodchopper. However, what the observer understands as a result of this observation may not be consistent with how the woodchopper views his own behaviour. To understand the woodchopper's behaviour, the observer would have to gain access to the woodchopper's 'subjective understanding', that is know what he himself made out of his chopping wood. The way to meaning, Schutz states, is to be able to put behaviour in context (i.e., was the woodchopper chopping wood to supply a logger, heat his home, or perhaps to get in shape?).

Considering that "...face-to-face interaction is the fullest condition of participating in the mind of another human being, and [that]... you must participate in the mind of another human being (in sociological terms, "take the role of the other") to acquire social knowledge" (Lofland & Lofland, 1995, p. 16), interviewing is considered as the most appropriate technique. It can provide access to the context of the teachers' mental world and thereby provide a way of understanding the meaning of their beliefs and behaviours and the reasons underpinning their choices. Moreover, because social and educational issues are abstractions based on the concrete experience of people, teachers' accounts are believed to give access to the most complicated social and educational issues. Seidman (1998) stated that interviewing "is a powerful way to gain insights into educational issues through understanding the experience of the individuals whose lives constitute education" (p. 7).

Furthermore, as a research method, interviews can be used to follow up unexpected results, or to validate other methods, or to go deeper into the motivations of respondents and their reasons for responding as they do (Cohen & Manion, 1994; Kerlinger, 1970). Because the aim of this investigation is basically to tease out the reasons behind teachers' responses on the questionnaire, interviewing is considered as the best avenue for the current inquiry.

10.5 Types of Qualitative Interviews

Interviewing can take the form of various kinds. In the current study two kinds of categorisation are used concerning interviews' structure and form. To follow is a brief discussion of both.

Interviews' Structure

Interviews range from highly structured interviews to open interviews (Figure 10.4). The structured interview requires the content and procedures to be organised in advance. This means that the sequence and wording of the questions are determined by means of a schedule and the interviewer is left little freedom to make modifications. In contrast, open interviews are of an unstructured and 'non-directive' nature thus offering greater flexibility and freedom to the interviewer (Cohen & Manion, 1994).

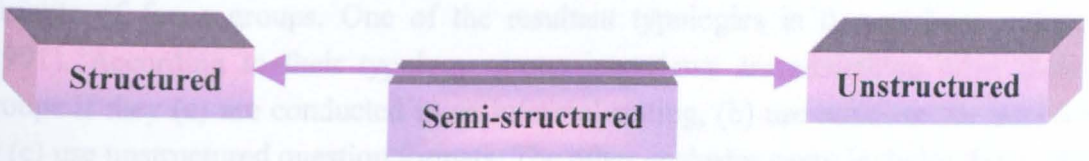


Figure 10.4: Interview Structures

Because of the exploratory nature of this investigation, it was thought that a semi-structured interview would offer both a degree of structure along with the necessary flexibility to pursue non-anticipated responses.

Semi-structured interviews "begin with a predetermined set of questions, but allow some latitude in the breadth of relevance. To some extent, what is taken to be relevant to *the interviewee* is pursued" (Freebody, 2003, p. 133). This type of interviews allows a situation to develop a degree of flexibility where the researcher and the interviewees become "co-researchers" (Braud & Anderson, 1998) and can both find the required room for expressing and understanding ideas. Interviews, in this context, are perceived as an interpersonal encounter between the interviewer and interviewees that allows both sides to explore the meaning of the issues raised and to analyse further the given answers. In other words, an encounter that gives the opportunity both for knowledge generation and construction: an objective that is consistent with social constructivist epistemological principles.

Interviews' Form

Other than the common form of 'individual or personal interviewing', another type of 'group or focus interviewing' is employed in the current study.

Group interviewing is broadly defined as "a research technique that collects data through group interaction on a topic determined by the researcher" (Morgan, 1996, p. 130). In essence, it is the researcher's interest that provide the focus, whereas the data themselves come from the group interaction (Morgan, 1988). Beck, Trombetta and Share (1986) describe it as "an informal discussion among selected individuals about specific topics relevant to the situation at hand" (p. 73). It is also considered as a "collectivistic rather than an individualistic research method that focuses on the multivocality of participants' attitude, experiences, and beliefs." (Modriz, 2000, p. 836).

It is also important to note that there is an ongoing debate on what criteria should be set to distinguish among the various types of group interviewing (nominal and Delphi groups, observations of naturally occurring groups, brainstorming groups, field interviews in naturally occurring settings, focus groups, etc.). Underpinning much of this effort is an attempt to answer the fundamental question of whether focus groups should be distinguished from other types (Morgan, 1996).

In response to that debate, two camps or schools of thought have emerged. One camp includes those who use an *inclusive* approach that treats most forms of group interviews as variants of focus groups. One of the resultant typologies is that of Frey and Fontana (1991). According to their typology, group interviews are something other than focus groups if they (a) are conducted in an informal setting, (b) use nondirective interviewing, or (c) use unstructured question formats. The other *exclusive* camp includes those who treat focus groups as a narrower method that should not be confused with other types of group interviews. A resultant version of this view is Greembaum (1993) and McQuarrie's (1996) view that focus group must meet some specific set of criteria. Typically, they should consist of structured discussions among 6 to 10 homogeneous strangers in a formal setting. On this latter viewpoint, Morgan (1996) comments, "it fails to demonstrate any advantages of either limiting the definition of focus groups to studies that meet these criteria or excluding group interviewing that deviate from them" (p. 131).

Indeed, many researchers (Knodel, 1995; Krueger, 1993; Morgan, 1996; Stewart & Shamdasani, 1990) believe that, depending on the purposes of the particular project, focus groups could be conducted in different ways: with more or less directive interviewing styles and more or less structured question formats. The use of a more inclusive or exclusive definition of focus groups depends on which approach "maximizes both the effective application of available techniques and the innovative development of new techniques" (Morgan, 1996, p. 131). In that regard, Morgan (1996) has identified three essential components that define a 'focus group': (a) being a research method devoted to data collection, (b) considering group discussion as the source of the data, and (c) acknowledging the researcher's active role in creating the group discussion for data collection purposes. Considering these components, the group interviewing conducted in the current investigation has indeed met these criteria. Consequently, the term 'focus group' is used interchangeably with 'group interviewing'. As such, this study follows an inclusive approach that "treats focus groups as a set of central tendencies, with many useful variations that can be matched to a variety of research purposes" (Morgan, 1996, p. 132).

Although this method of data collection has undoubtedly existed a long time, Morgan (1996) claims, it was not until the past few decades that a remarkable surge of interest in group interviewing has been noticed. A review of its historical development has been discussed thoroughly by various authors (e.g., Modriz, 2000; Morgan, 1996; Vaughn, Schumm, & Sinagub, 1996). Despite being used extensively in different research areas (e.g., market research), it has taken some time for qualitative social researchers to accept

group interviewing and to get acquainted with the method (Modriz, 2000). Consequently, Morgan and Krueger (1993) state, "social sciences and evaluation research are still at a stage at which most of our knowledge about focus groups come from personal experiences rather than systematic investigation" (p. 3). Hence, the existing information regarding their use is not only scarce but also unsystematic.

Nonetheless, the recent bloom in its use can be attributed to the advantages this technique seems to offer compared to other qualitative techniques in general and individual interviewing in particular. Compared to individual interviews, the clear advantage of group interviews is 'the group discussion' (Vaughn et al., 1996). Hess (1968) describes the distinct benefits of participants' interaction as follows: *synergism* (when a wider bank of data emerges through the group interaction), *snowballing* (when the statement of one respondent initiate a chain reaction of additional comments), *simulation* (when the group discussion generate excitement about a topic), *security* (when the group provides a comfort and encourages candid responses) and *spontaneity* (because participants are not required to answer every question, their responses are more spontaneous and genuine).

The work of Fern (1982) and Bristol and Fern (1996) on the relative productivity of individual interviews and focus groups was one of the very few methodological studies that involved an empirical comparison between the two methods. Their findings suggest that there is little empirical evidence to support the view that focus groups are superior to other methods in this respect. Bogardus (1926; 2003) expresses this view by stating that group interviewing is developing not so much as a complete substitute for the former, but as a substitute for the less personal part. He believes that a large amount of the valuable work in connection with individual interviews can be accomplished by group interviews, leaving to personal interviews only the most vital phases.

In the current study, group interviewing was particularly used to allow access to research participants who may find one-to-one interaction 'scary' or 'intimidating' (Modriz, 2000). By creating multiple lines of communications, group interviewing offers participants a safe environment and a permissive atmosphere where they can share ideas, beliefs, and attitudes in the company of people who share with them similar grounds. Indeed, some of the studies that have been conducted on group interviews show that group participants find the experience more gratifying and stimulating than individual interviews (Morgan 1988, Wilkinson, 1998).

Moreover, the current use of group interviewing made it possible to observe the interactive processes occurring among participants. This interaction at times decreases the amount of interaction between the facilitator and the individual members of the group (Modriz, 2000). As a result, more weight was given to the participants' voices, opinions and viewpoints.

In the current investigation, group interviewing was used not to reach or build a consensus among the participants; rather it aimed to foster a range of diverse opinions about the topics at hand. The focus of its use was to find out participants' points of view and to

encourage them to reflect on their teaching reality, express different opinions and share their experiences. Therefore, importance was given to generating these opinions and not to determine the exact strength of them. Although that could have been probed, the quantitative procedure used in the third phase of the study was considered as more appropriate for ascertaining this information.

Indeed, a more complete and revealing understanding was obtained from the experiences each teacher shared with the rest of the group. This was particularly evident when teachers of different schools started to share experiences and raise issues beyond the limitation of the interview schedule, also when teachers of different Perry thinking position were included in the same group (GI 1: 'Perry A' ID 9/ M/ S, 'Perry B' ID 10/ M/ S and 'Perry A' ID 11/ M/ S)*. This has highlighted the different ways each of them chooses to react to what they agree to be a common reality (more about that will be discussed in Chapter Eleven). This, indeed, has allowed for gathering rich and large amounts of information in limited periods of time.

10.6 Pitfalls of Using Qualitative Interviews

A number of problems attend the use of interviewing as a qualitative research technique. One of these is that this method is very time consuming in the construction, transcription and the analysis stages. A single interview could last up to one hour and sometimes more.

A second problem is that of validity. Validity can be affected negatively through bias in overstating or understating the "true value" of an attribute (Lansing, Ginsburg, & Baraaten, 1961). In interviews the source of bias may be included in the characteristic of the interviewer: the attitudes and opinions of the interviewer; the tendency to see the respondent in his/her own image; a tendency to seek answers that support preconceived notions; and misperceptions of what the respondent is saying. On the part of the respondent, bias may be caused by misunderstandings of what is being asked; a tendency to hold back information; a tendency to show him/herself in a good light; and a tendency to be unduly helpful anticipating what the interviewer wants to hear (Cohen & Manion, 1994).

One final concern is related to the interviewer-interviewee relationship. If the interviewee suspects some kind of 'agenda', responses might be misleading (Oppenheim, 1992). For example, if the interviewer is perceived as an authority figure, this might impact the interviewee's responses with potential feelings of uneasiness, insecurity and threat. With a number of the Egyptian teachers that was unfortunately the case: a limitation that had not been fully anticipated. Being introduced either through school head teachers or as a researcher who is conducting research in "Scotland" was seen to some as a form of supervision.

* The meaning of these codes is presented later in this chapter (section 10.10).

Several procedures, therefore, were put in place to minimise bias and ensure a greater degree of validity. The researcher tried to maintain objectivity through careful structuring of the questions in a way that would make the meaning crystal clear.

Effort was taken to create a friendly atmosphere where respondents felt at ease. The researcher attempted to create a feeling of togetherness with the interviewees by communicating that the purpose of the study was a joint pursuit to shed light on their complex world of teaching and to give them an opportunity to voice their views. They were also reassured of the voluntary nature of their participation, confidentiality and the anonymity of their responses and were explicitly asked for their assent to tape record the interview.

Despite all efforts, it was inevitable that some interviewees would be more "wary" than others. On some occasions, note taking substituted tape recording as a form of further reassurance. In these cases, notes were taken and read back to the interviewees (e.g., 'Perry A' ID 15, 16, 17, 18/ M/ S/ GI 3)*. Group interviewing was also used, it was anticipated that feelings of safety might be higher on a group-level. As has been mentioned earlier, this, in fact, turned out to be a good opportunity to develop the discussion and accommodate a wide range of responses.

10.7 Interview Schedule

The schedule (Appendix 10.1) of these semi-structured interviews was set to give a guiding framework for the discourse. In the majority of cases, the interviewed teachers were so engaged in the discussion and in trying to make sense of their complex teaching reality that they raised a wide range of issues.

In conducting the interviews, the questions were asked using the "funnel" sequence approach (Tuckman, 1972). In such an approach, the interviews starts off with a very broad issue and the progressively narrows down the scope of the questions until it comes to some very specific points. To begin, respondents were given statements upon which they were asked to comment. This particular format provided a structured and supportive start to the conversation and helped to identify their thinking positions in terms of Perry's model. The general non-direct approach is believed to be more convenient as Tuckman (1972) suggests that direct specific questions may cause a respondent to become cautious or guarded and give less-than-honest answers while non-specific questions may lead, circuitously, to the desired information but with less likelihood of cautiousness. The interview, then, progressed towards more structured, specific and direct questions. Where applicable, teachers were asked to offer examples of their classroom practices thus linking their beliefs with actions. The purpose behind that is to get as close as possible to teachers' 'theory in action' (Caine & Caine, 1997a, 1997c) (the beliefs that actually drove their actions) not the ideal scenarios of their 'espoused theories' (Caine & Caine, 1997a, 1997c) (what they

* The meaning of these codes is presented later in this chapter (section 10.10).

said). This paved the way for discussion about the why they believed and behaved as they described.

10.8 Study Sample

When considering the sample number of this study, the question of importance was 'how many participants is enough?" In establishing an answer to this question, three criteria were considered. The first criterion was *convenience*. Indeed, finding teachers who are willing to give some of their time to participate in the study was found more difficult than anticipated. A large number of teachers were approached (59 Egyptian teachers), but not all agreed to participate (23 teachers) and fewer confirmed their approval and turned up on the day (18 teachers). The second was *sufficiency*. The number of the teachers interviewed was considered sufficient since one or more teachers represented each of Perry's thinking positions. This was particularly achieved since some teachers of the groups that are less represented (Perry A and Perry B thinking teachers) expressed their willingness to continue being interviewed more than once. This has ended with a series of two interviews and three interviews respectively with 'Perry B' (ID 2/ F/ S/ II)* and 'Perry C' (ID 1/ F/ S/ II) teachers.

The third was *saturation of information* (Bryman, 2004; Seidman, 1998). Many researchers (Glaser & Strauss, 1967; Lincoln & Guba, 1985) discuss a point in the study at which the interviewer begins to hear the same information reported (i.e., when s/he is no longer learning anything new). In the current investigation, this has indeed been achieved as almost all of the interviewed teachers from Perry's different thinking positions raised the same issues repeatedly and shared the same concerns (more about that will be discussed in Chapter Eleven).

It is also important to note that some researchers (Douglas, 1985; Seidman, 1998) recommend the number of 25 interviewees to be convenient. Putting into perspective that the aim of this phase was to generate themes that would be put to further investigation (Chapter Twelve), the current number was believed to be convenient.

Morgan (1998a) suggests that the typical group size is six to ten members. In the current study, smaller groups of three and four members were arranged. There are five reasons behind this choice. First, a group with this number is believed to be much easier to manage. Second, it ensures that every teacher gets the opportunity to participate equally in the discussion. This is particularly important since the goal of the interviewing is not to "hear numerous brief suggestions" (Morgan, 1998a, p. 75), but rather to delve deeper gleaning teachers' personal account, beliefs and practices. Third, because it is likely that teachers would have a lot to say on the raised topics, this number would make the subsequent processes of transcribing and analysing the data more manageable. Fourth, given the complex and diverse nature of the issues included in the schedule, it is believed

* The meaning of these codes is presented later in this chapter (section 10.10).

that this number would allow for getting as much information as possible in the limited period of the interview time. Fifth, because the main reason behind going for this type of interviewing was to lessen teachers' sense of threat, it is believed that this small number will work to that effect.

In the end a total of eighteen Egyptian teachers took part in the follow-up interviews (Table 10.4). Eight individual and three group interviews were undertaken. The teachers' sample was gathered from the same schools that were involved in completing the questionnaires.

N	Women	Men
Individual interview	5	3
Group interview	0	10 (3+3+4)
Total participants	5	13

Table 10.4: Number of Interviewed Teachers

10.9 Interviews Analysis

One of the main difficulties with qualitative research is that it quite rapidly generates a large and cumbersome database of unstructured textual material. By the end of conducting the interviews, researchers face massive amounts of filed notes, audio recording and interview transcripts, all of which must be examined and interpreted. Miles (1979) has described qualitative data as an "attractive nuisance" (p. 590), it is attractive because of its richness by being "full, earthy, holistic, real, undeniable, serendipitous" (p. 90), but a nuisance because it is difficult to find analytic paths through that richness. The danger of being captivated by that richness and failing to give the data wider significance is something that Bryman (2004) guards researchers against. It is a condition well known to qualitative researchers named by Lofland (1971) as 'analytic interruptus'.

The difficulty of finding a path through the "thicket of prose that makes up qualitative data" (Bryman, 2004, p. 399) is further accentuated by the fact that there are few well-formulated and widely accepted rules for the analysis of qualitative data. Unlike quantitative data, "[q]ualitative data analysis has not reached this degree of codification of analytic procedures" (Bryman, 2004, p. 399). What is provided then are broad guidelines (Arksey & Knight, 1999; Bryman, 2004; Okley, 1994).

One other feature that distinguishes qualitative research and qualitative interviewing in particular is the fact that the process of data analysis takes place concurrently or simultaneously, albeit informally, with data collection. This is through the iterative, recursive and dynamic nature of the interviewing process.

As such, the data collected from the conducted interviews were perceived as "meaningful relations to be interpreted" (Kvale, 1996, p. 11). Data were treated like shots of scenes that make up a potential storyboard. Analysing these data involves various processes of organising and reducing the data, synthesizing, searching for significant patterns and discovering what is important. In doing so the ultimate aim is to "organise what... [the researcher] has seen, heard, and read and try to make sense of it in order to create explanations, develop theories, or pose new questions" (Ary et al., 2006, p. 490). To follow is a detailed account of the various phases involved in conducting data analysis (Figure 10.5).

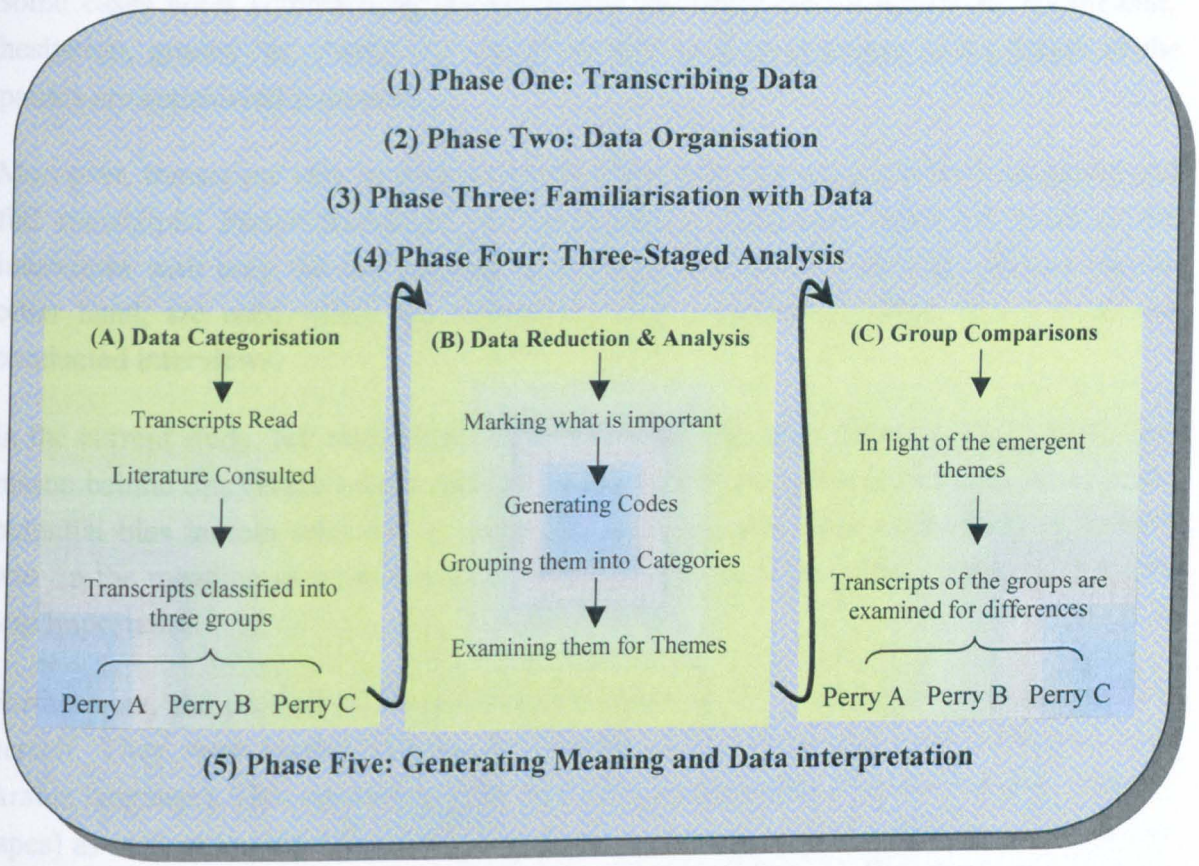


Figure 10.5: A Summary of the Interview Analysis Phases

Phase One: Data Organisation and Management

The first phase in analysing the data involved organising the data so that they can be easily handled. This mainly involved transcribing the interview tapes. Transcription is the production of a written record of the interviews. It is important to note that many qualitative researchers deny that there is one real version of reality to be captured (Arksey & Knight, 1999; Ary et al., 2006; Bryman, 2004). Accordingly, a transcript should be considered as *only* one interpretation of the interview. This view is typically expressed in the words of Poland (1995):

> ...committing verbal exchanges to paper seems to result in their immediate deterioration: context, empathy, and other emotional dynamics are often lost or diminished, and the language seems impoverished, incoherent, and ultimately

> embarrassing for those who have cause to read back over their contributions. (p. 299)

Furthermore, because most interviews only capture the spoken aspects of the interview, missing the setting, contact, body language and 'feel' (Arksey & Knight, 1999), Mishler (1991) draws an analogy between a transcript and a photograph. Just as a photograph is one, frozen, printed and edited version of reality, so too are the transcripts.

Having said that, it is important to note that transcripts vary in the level of details the transcribers commit themselves to depending on the purpose of the research. So whereas in some cases notes summarising the key points are sufficient, in others the respondents' hesitation, grunts, 'er', 'well...', 'mmm' as well as time estimates of the length of the pauses are considered important.

Moreover, transcripts vary in their coverage of the interview accounts between partial and full transcripts. Partial transcripts are used when a researcher keeps full notes of the interviews with only the key sections of the tape transcribed. Full transcriptions, on the other hand, are used where the researchers have a complete written record of all the conducted interviews.

In the current study, full transcripts of the individual and group interviews were used. The reason behind this choice was to avoid missing any important information and to avoid any potential bias in data selection or interpretation. Moreover, because the focus of interest was on the meaning of what is said, a thorough account of the details was considered of less importance.

Furthermore, the process of transcribing the interviews was conducted by the researcher herself. They were handwritten in the language with which they were conducted (i.e. Arabic language). This resulted in interview tapes equivalent to 15 hours (10 x 90-minutes tapes) as well as around 116 handwritten pages of transcripts and 3 pages of notes written during one group interview. In that respect, as has been mentioned before (section 10.8), some of the teachers were interviewed more than once. Transcribing interview tapes was a time-consuming process with a 90-minute tape between 5 to 7 hours. Though at times it was mechanical, repetitive, fatiguing and sometimes stressful, especially with the group interviewing and the poor recording quality of a couple of the interviews, there were undoubtedly some advantages gained from transcribing the interviews personally in that it helped in becoming more familiar with the data and also in interpreting the tone of the interview and the issues raised.

Phase Two: Familiarisation with the Data

Once the transcriptions were completed, the second phase of getting familiar with the data began. Transcripts and notes were read and reread many times. Moreover, notes were taken of the thoughts and the key ideas that were raised. In doing so, basic ideas about how to treat the data started to emerge. These were developed to form an outlined plan as to how

to analyse the data. This plan involved *three* stages: the *first* was to allocate each of the teachers in one of Perry's thinking positions resulting in three groups: 'Perry A', 'Perry B' and 'Perry C' thinking groups. The *second* was to analyse the data included in three resultant groups searching for as many factors as possible that teachers believed were responsible for them adopting certain belief profiles and adopting certain practices. The *third* was to examine the responses of the participants of each group in an attempt to observe if there are any patterns noticeable and distinctive of one group compared to the other two.

Phase Three: The Three-Staged Data Analysis

As mentioned earlier, analysing the data involved three stages. Each of them is described in details next.

Stage One: Data Categorisation

The interview transcripts of each teacher were analysed with the aim of assigning every teacher a qualitative evaluation to identify him or her on one of Perry's three thinking categories. Using the belief characteristics most dominant in each of Perry's thinking positions, a profile was built of each teacher's perceptions. This was accomplished by consulting the conceptual framework of Perry's (1970) scheme and Johnstone's (1998) modifications of it. This helped in making a confident judgement as to which category each teacher belonged. This is discussed further in the next chapter (section 11.2.1). The end result was that the data were categorised into three groups where each of which included a large pool of transcripts assigned to teachers who dominantly belong to one of Perry's thinking positions. These transcripts were further analysed in the second stage with the aim of finding out the factors teachers' perceived were behind their current belief profile and practices.

Stage Two: Data Reduction and Analysis

In this phase, an attempt was made to analyse the enormous amount of text involved in each of the three categories mentioned above. The vast array of words, sentences, paragraphs and pages had to be reduced to what was considered of most importance and interest (McCracken, 1988; Seidman, 1998; Wolcott, 1990). Reducing the data was done inductively rather than deductively (Figure 10.1). Indeed, the researcher did not address the material with a set of hypotheses to test or with a theory developed elsewhere to which the current data were to be matched (Glaser & Strauss, 1967). The text was approached with a state of 'open mindedness' (Seidman, 1998) seeking what emerged as important and/or of interest. This process had involved the following procedures:

Marking what is of interest in the text

The first procedure in reducing the text was to read the text and highlight the units of data (i.e. a sentence, a paragraph or a sequence of paragraphs in the transcripts) that were

considered interesting and important. The question here is 'which one should be chosen?' and 'upon what criteria attention should be focused to one unit of data not the other?' Raising these questions indeed entail one of the major criticisms levelled against qualitative research in general: being too impressionistic, subjective and lacking transparency. This view is typically expressed in the following quotes:

> The analysis of data is perhaps the most demanding and least examined aspect of the qualitative research process. (McCracken, 1988, p. 41)

> In qualitative research, little is ever usually written about the process of analysis at all... little is said about who the analysts are, ...which particular perspectives they adopt... how are disagreements resolved... whether full transcripts are used, how much is reported, what level of uncodable or unsortable data is tolerable, what basis is used for filtering data... . (Powney & Watts, 1987, p. 174)

> If I were to try and put my finger of the single most serious shortcoming relating to the use of interviews in the social sciences, it would certainly be the commonsensical unreflexive manner in which most analyses of interviews are conducted. (Briggs, 1986, p. 102)

From a quantitative perspective, this means that qualitative findings rely too much on the researcher's often unsystematic views about what is significant and important. They are also based on the close personal relationships that the researchers frequently have with the people studied. This is precisely because:

> ... qualitative research often begins in a relatively open-ended way and entails a gradual narrowing-down of research questions or problems, the consumer of the writings deriving from the research is given few clues as to why one area was the chosen area upon which attention was focused rather than another. (Bryman, 2004, p. 284)

From a qualitative perspective, however, this "winnowing" (Seidman, 1998, p. 100) process is described as a 'personal process' of interpreting reality and 'making sense' of it (Marshall, 1981). In essence, this stance matches best the constructivist and interpretive epistemology of the qualitative researchers. Indeed, qualitative researchers acknowledge that what they bring to the data while reading the transcripts is their sense of what is important. They believe in their confidence of being able to respond to meaningful 'chunks' of transcript. This is best expressed in Marshall's (1981) reflections on the process as she says that she can recognise these 'chunks' without having to agonise over what level of semantic analysis she is doing. What is required then in responding to the interview text is not different from what is required in responding to any other text: close readings plus judgement (Mostyn, 1985; Seidman, 1998).

Marshall (1981) states that researchers' judgement that is based on their experiences in working with and internalising the interview transcripts may be the most important ingredient researchers can bring to the study. Nonetheless, she also sheds light on the

dilemma researchers at times feel. In this process, there comes moments when, while working with the data, researchers lose confidence in their ability to sort out what is important, wondering if they are making it all up, feeling considerable doubt about what they are doing. A trap of what she calls 'self-delusion' researchers guarded against being 'the bane' (Miles & Huberman, 1994) of those who analyse qualitative data. Marshall (1981) state that it is a state of anxiety qualitative researchers have to learn to live with.

Having read teachers' interview transcripts numerously, the researcher's judgement was used to select the units of data that were of interest and importance. In doing that the researcher was guided roughly by the main research questions and by the main objective of this analysis.

Creating Codes, Categories and Themes

Simultaneous to the close reading and examination of the data, the process of searching for regularities, patterns as well as topics the transcripts covered was initiated. This involved the development of a preliminary system of coding categories: a process Ary et al. (2006) labelled as "open coding, preliminary coding or provisional coding" (p. 492). Indeed, coding the data is considered as a crucial step of qualitative data analysis (Ary et al., 2006; Bogdan & Biklen, 2007; Richards & Richards, 1995). Wiersma (2000) has held this process as analogous to getting ready for a "rummage sale" (p. 203) where a continuous searching and sorting out of the stuff into categories that could then be subdivided into other categories which in turn could be further subdivided into other categories and so forth take place.

The units of data previously marked as potentially interesting and important were then re-examine with the intention of assigning them codes. The coding of data units is done in order to begin to recognise the differences and similarities existing in the data. In doing so, the advice of Richards and Richards (1995) to code liberally and to categorise richly was followed.

The emerging codes were to be subjected to further reductions and modifications in later stages. The ideas for finding important concepts by which to code emerged from the interview transcripts rather than from examining the published literature a process that Rubin and Rubin (2005) consider as "more important" (p. 210). The concepts were based on the questions asked (i.e., issues related to students' learning, teachers' role, nature of knowledge, the role of peers, exams, etc.), on accounts interviewees frequently mentioned (i.e., issues related to the educational system, their school ethos, their training, the standards they have to meet, resources supplement, classroom number, etc.) and on ideas that were indirectly revealed through the interviewees' accounts (i.e., feelings of disempowerment and dissatisfaction, being pressurised, losing their sense of autonomy, being held accountable for failure if the standards the system impose were to fail, being underpaid, etc.). As such, the codes were descriptive or interpretative. In this way of coding, portions of the transcripts were seen as belonging to certain names and labels. This

data fragmentation entailed cutting up the transcripts (literally using a pair of scissors), sorting and shifting them into files of chunks of data, with each file ultimately representing a code.

After all the significant units of data have been coded, the codes were grouped – when possible – by similarity to create tentative categories. At this stage, further revision of the codes and the categories was considered through sorting and shifting the data. At this point, decisions also had to be made concerning some of the overlapping codes. In doing so, it is important to realise Bogdan and Biklen (2007) words that the researcher is "not attempting to come up with the right coding system, or even the best. What is right or best differs according to... [the researcher's] aims" (p.185). After generating the codes and the categories, the remaining 'unmarked' parts of the transcripts were revisited. It was essential at this point to see them in light of the new development of the analysis to make sure that no important unit of data was excluded.

These categories were then studied for thematic connections by exploring the logical relationships within and among them (Figure 10.6). The aim of this was to identify a logical chain of evidence through the connective threads that exist among the experiences of the interviewed teachers that would ultimately provide explanations of the studied phenomenon s(Arksey & Knight, 1999; Miles & Huberman, 1994). By the end of the analysis, seven themes were identified and documented based on each grouping (Figure 11.1). These permitted the researcher to shed light on the possible causes or circumstances that seem to generate teachers' regressive preferences for 'Perry A and B' thinking.

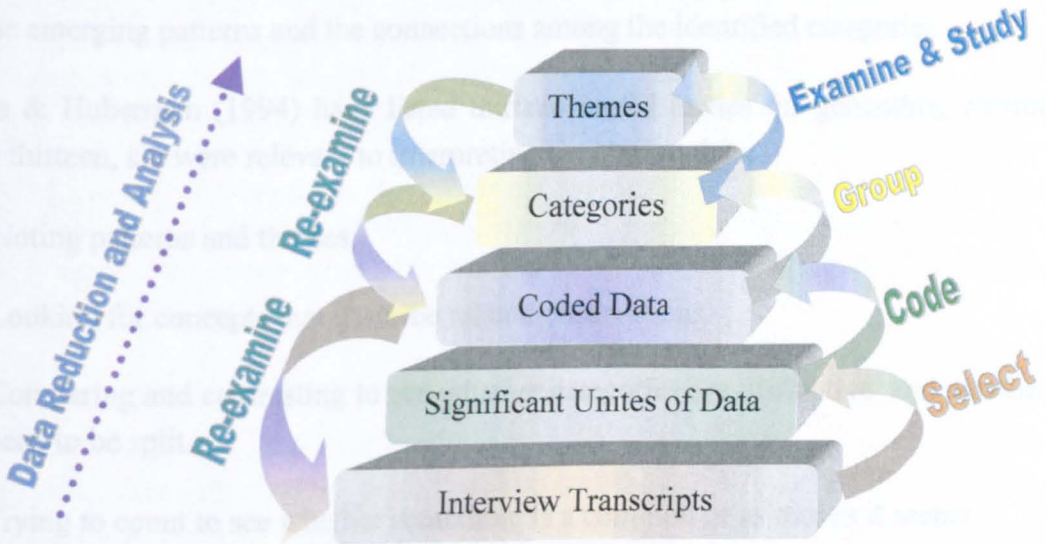


Figure 10.6: Data Reduction and Analysis

Stage Three: Groups Comparison

The previous stage was concerned mainly with generating the themes that would help explain the factors the interviewed Egyptian teachers collectively perceived responsible for their preference to 'Perry A and B' thinking. The focus of interest of this stage of the

analysis was to conduct cross-groups examination. The purpose behind it was to explore in more detail the extent to which the responses among Perry's three thinking positions varied. In light of the seven generated themes (Figure 11.1), when possible, patterns of responses noticed among teachers of Perry's three thinking positions were traced. These differences were then documented and compared with what exists in the published literature (Chapter Eleven).

It was hoped that this three-staged analysis of the data would glean as much information as possible and provide further insights into the factors that influence teachers to adopt certain beliefs and practices. It would also explain how teachers of different thinking positions react to what they perceive to be a common reality.

Phase Four: Generating Meaning and Data interpretation

Data interpretation is "a process that inevitably pervades the whole research process, from conception to reporting... It is an elusive process to capture in writing" (Arksey & Knight, 1999, p. 169). Data interpretation requires careful consideration of the data at hand, but over and above that, it takes creativity, imagination and a degree of luck (Richards & Richards, 1994).

As mentioned before, interpreting qualitative data is a difficult process simply because, unlike quantitative data, there are no sets of rules or statistical tests of significance researchers can easily follow to facilitate data interpretation. As a process it involves reflecting on the words of the participants and abstracting important understandings from them (Ary et al., 2006). It is an inductive process in which generalisations are made based on the emerging patterns and the connections among the identified categories.

Miles & Huberman (1994) have listed thirteen useful tactics for generating meaning, of these thirteen, six were relevant to interpreting the current data:

- Noting patterns and themes.
- Looking for concepts that describe related observations.
- Comparing and contrasting to see whether categories are distinctive, and whether they need to be split.
- Trying to count to see whether something is a common or as rare as it seems.
- Explore relationships between variables; in the process of asking whether there might be 'hidden variables' that one has missed.
- Check whether the analysis can be put together in a story that is plausible to the researcher and that can be related to the picture one drew in the literature review.

Indeed, generating meaning of the interview transcripts is the outcome of many elements interacting together (Figure 10.7).

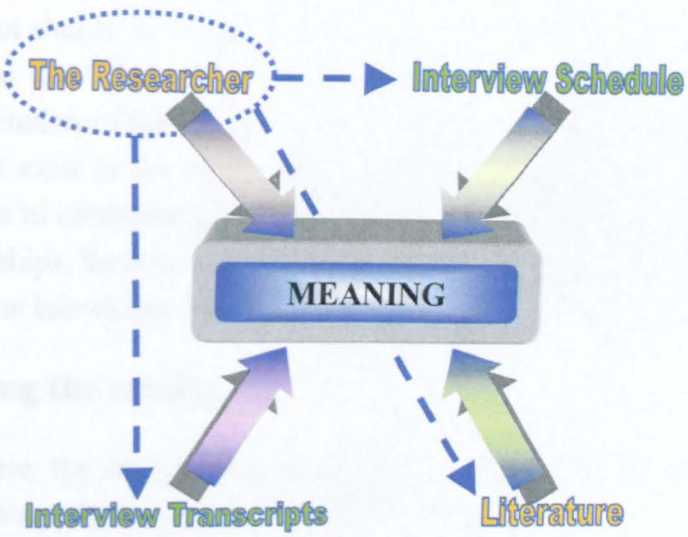


Figure 10.7: Elements Interacting to Generate Meaning of the Interviews

Despite the fact that a myriad of sophisticated measures are developed to control 'data gatherers' influence, its impact is believed to be inherent in most research methods (e.g. participant observation, most experimental and quasi-experimental methodologies) (Campbell & Stanley, 1963). This is specifically true of interviewing, Seidman (1998) puts it saying:

> Every aspect of the structure, process, and practise of interviewing can be directed toward the goal of minimizing the effect the interviewer and the interviewing situation have on how the participants reconstruct their experience. No matter how diligently we work to that effect, however, the fact is that interviewers are a part of the interviewing picture. They ask questions, respond to participant, and at times even share their own experiences. Moreover, interviewers work with the material, select from it, interpret, describe, and analyze it. Though they may be disciplined and dedicated to keeping the interviews as the participants' meaning-making process, interviewers are also part of the process. (p. 16)

It is important to note that one of the major differences between quantitative and qualitative approaches is that instead of decrying the fact that the human instrument used to gather data does affect this process, in qualitative research the role of the interviewer is recognised and affirmed (Seidman, 1998). Lincoln and Guba (1985) state that the human interviewer can indeed be a marvellously smart, adaptable, and flexible instrument who can respond to situations with understandings, tact and skill. Seidman (1998) believes that "[o]nly by recognizing that interaction and affirming its possibilities can interveners use their skills to minimize the distortion that can occur because of their role in the interview" (p. 16-17).

This does not mean that the qualitative researcher can rely on personal feeling when interpreting the data. Considering the validity of the interviews is crucial in all its phases: data gathering, analysis and interpretation (as discussed earlier in Section 10.6). The interpretation can not simply be "a figment of your [the researcher's] imagination but must be supported by the data" (Ary et al., 2006, p. 500). It is, rather, the outcome of the researcher's interpretation of the data s/he has in light of her/his interview questions and transcripts and what exist in the literature (Figure 10.7). Data interpretation involves the researcher's attempts to comprehend the phenomenon under study, synthesise information, and explain relationships, theorise about how and why the relationships appear as they do, and reconnect the new knowledge with what is already known (Bryman, 2004).

10.10 Presenting the results

In the chapter to come, the analysis and interpretation of data are presented. In doing so, some aspects concerning data presentation should be considered.

Only a sample of quotes from the interview transcripts is presented to reflect the typical view of most of the teachers. Teachers' quotes are presented to reflect – where possible – the views held across teachers in each of Perry's three thinking positions. Because the interviews were conducted and transcribed in Arabic, translation of the chosen few were conducted at the final phase. The translation was conducted by the researcher herself. It is to be acknowledged that capturing in English the tone of the interviews, the use of the Egyptian slang and colloquialism were not – as anticipated – easy. However, having had her first degree in English language and literature, the researcher was able to manage conducting such translations. Moreover, the translated quotes were checked for comprehension and structure by an Egyptian interpreter (working as an interpreter in Glasgow) and by an English-speaking research student (studying for her Doctor of Philosophy degree in Adult Education Department, Faculty of Education, Glasgow).

For the purpose of anonymity, special codes are assigned for the interviewees' presented quotes (Table 10.5).

Code	What it stands for
ID	The number assigned for each teacher
F	A female teacher
M	A male teacher
P	A primary and preparatory teacher
S	A secondary teacher
II	The teacher is interviewed individually
GI	The teacher is a member of a group interview

Table 10.5: The Codes Assigned for the Interviewed Teachers

Thus, for every quote a code will be assigned to identify some aspects about the teacher from whom that quote was taken. If, for instance, the code ('Perry A' ID 11/ M/ S/ GI 1) was assigned to a quote, this indicates that the 'ID 11' teacher is a 'M' male teacher. He is

a 'S' secondary teacher and he was a member of one of the three group interviews conducted. His group was assigned the number GI 1, to distinguish it from that of the other groups (i.e., GI 2 and GI 3).

Also presented for each of the emergent themes is the number of teachers who raised the concerned issues to examine how common or rare these views were. It is, however, important to note that in some instances the interactive and cumulative nature of the sequence of the interviews has provided the researcher with the opportunity to take something from one interview to be investigated further in the following ones. Furthermore, each interview provided a foundation of details that the ones to follow were able to eliminate by showing different perspectives, illuminate by providing more explanations and more evidence to it or initiate different issues that were related to it. This was considered as important to provide more explanation and understanding of the factors teachers held as responsible for their preference for 'Perry A and B' thinking. Presenting such numbers does aim at getting a clearer and closer picture of how the views were common among the interviewed teachers. Nonetheless, it is important to note that the aim of this phase of the study was to generate as many factors as possible. These factors will subsequently be subjected to wider examination in Chapter Twelve.

10.11 The Current Data Analysis Approach and the 'Grounded Theory'

From the previous discussion, it can be argued that the current approach of data analysis follows some of the features of a methodological framework known as 'the grounded theory'. Grounded theory has become by far the most widely used framework for analysing qualitative data. The wellspring of this approach is documented in Glaser and Strauss' (1967) book *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Since then each of them has developed the grounded theory along different paths. This was marked by Strauss publication of *Basic of Qualitative Research: Techniques and procedures for developing grounded theory* in 1990 together with Corbin. Glaser (1992) has criticised the approach Strauss' was promoting of the grounded theory to be too prescriptive emphasising too much the development of concepts rather than of theories. This ongoing debate has produced a considerable controversy as to what grounded theory is and what it involves.

Nonetheless, grounded theory is basically defined as an approach to the analysis of qualitative data that aims to "generate theory out of research data by achieving a close fit between the two" (Bryman, 2004, p. 540). Strauss and Corbin (1990) also define it as "a theory that was derived from data, systematically gathered and analyzed through the research process. In this method, data collection, analysis and eventual theory stand in close relationship to one another" (p. 12).

It is, however, important to note that there is no definitive account of what grounded theory is and what it entails (Charmaz, 2000). Moreover, some researchers (Arksey & Knight, 1999; Bryman, 1988b; Charmaz, 2000; Locke, 1996) suggest that grounded theory is

honoured more on the breach than in the observance, implying that claims are often made that grounded theory has been used but evidence reveals this is at best uncertain. Bryman (2004) states that the term is commonly employed to imply that the researcher has grounded his/her theory in data. Arksey and Knight (1999) and Locke (1996) also point out that the term is commonly used when the researcher uses only one or two features of grounded theory without accurate qualification.

For the sake of precision and accuracy, this term was not used to describe the current approach for data analysis. As has been mentioned, the current study does only in some elements (i.e., generating codes, categories, exploring the relationship between categories, generating themes, examining the data further in light of these themes in search of subgroups differences) follow the general framework of the grounded theory approach.

10.12 Conclusion

In this chapter the research design of the second phase of the study has been described. This involved a discussion of the conceptual framework of the three-phased project as well as that of the qualitative phase of the study. This chapter also presents a description of the research method, participating subjects and data analysis. In the next chapter, the findings of this research phase are presented, interpreted and discussed.

Chapter Eleven

Egyptian Teachers' Interviews: Phase Two

Data interpretation and Discussion of Findings

11.1 Introduction

Because the pattern of the Egyptian teachers' responses from phase one was distinctively regressing to favour 'Perry A' and 'Perry B' thinking, the aims of conducting these interviews were to examine further the consistency between teachers' questionnaire responses and the current interview accounts. It is also hoped that with these interviews an access will be gained to go deeper into teachers' mental world to gain an insight into why they deviated from Perry's anticipated pattern. As the previous chapter dealt with issues related to the methodologies and the methods of this phase, the interest of this chapter is to present and discuss the findings from the conducted interviews.

Because the focus of this phase is the Egyptian teachers, further information about the structure and the background of the Egyptian educational system is provided in Appendices (1.1) and (11.1) respectively.

11.2 Results and Data Interpretation

The majority of teachers held 'Perry A' congruent beliefs about teaching and learning (Table 11.1). Compared to the 'Perry A' thinking majority 77%, a minority of 17% were in the 'Perry B' and only 6% in the 'Perry C' thinking positions. The purpose behind this quantification is not to rigidly compare interview numbers with the questionnaire responses but rather to demonstrate the variety of Perry's thinking positions that happened to exist in the interviewed cohort. Broadly speaking, this finding shows consistency with the data gained from analysing Egyptian teachers' responses on 'Perry's Questionnaire'.

Perry Positions	Perry A	Perry B	Perry C	Total
Teachers' Numbers	14	3	1	18

Table 11.1: Interviewed Teachers' Perry Thinking Positions

Results from the interviews of why these positions are so dominant are presented in two sections. The first identifies the characteristics of the teachers' various Perry thinking positions within the interviewed sample. The second deals with the various reasons held by teachers as responsible for the development of these particular thinking positions.

11.2.1 Identification of Perry's Positions in the Interviewed Teachers

Identification of 'Perry A' Thinkers in the Interviewed Teachers

The teachers identified as 'Perry A' thinkers shared beliefs about learning as the transfer of knowledge from teachers to students. These teachers felt that it was the teacher's responsibility to provide students with a structured learning environment where pre-specified textbook information, facts, and skills were passed to students who acquired this information through memorisation, practice, rehearsal and repetition. The teacher's ultimate goal was to prepare students to pass exams which was primarily achieved by students' ability to replicate what has been transmitted. They viewed students as passive recipients and knowledge as the textbook information. The predominant mode of teacher-student interaction was lecturing and direct questioning. Teachers, in their lesson planning, were very aware of the time schedule previously set for a certain topic to be 'covered'. They specified exactly how much time was to be spent on any topic depending on its contents and expressed concern and irritation if these timescales were not accomplished.

Of great concern to 'Perry A' thinkers was the issue of teachers' control and discipline. They talked of students disrupting instruction and allied this with procedures they used to 'punish' those who were not paying enough attention or obeying the rules. Their beliefs are in alignment with a realist ontology and objectivist epistemology discussed in chapter two. From their discussion, it was clear that their teaching practices conformed to the 'traditional' behaviourist paradigm detailed in chapter four.

Sample interview transcripts typical of these views are presented next. More of their views and quotes will be revealed throughout the subsequent presentation of results.

"I can't let the students see me not knowing anything... I have to make them believe that I am their teacher... the one in charge...I can't be wrong... they'll lose confidence in me if I tell them that I am a learner ...who will do the teaching then" ('Perry A' ID 9/ M/ S/ GI 1).

"There is a very limited chance to do cooperative learning...because there is no time ... also students will never know what is the point of it anyway... it is just a waste of my class time" ('Perry A' ID 4/ F/ S/ II).

"... In Mathematics... There is always one right answer and it is the student's role to find it out" ('Perry A' ID 3/ F/ S/ II).

"Students are not ready... they don't want to think or learn... they want me to stick to what will be in exams for them to study it by heart... If I try to introduce something, they tell me 'come on Mrs. X [her name] *why bother? This is not going to come in exams, isn't it?... and this is what it is about really"* ('Perry A' ID 4/ F/ S/ II).

"... If I leave them [students] *without direct control... they will play... they don't know what is best for them"* ('Perry A' ID 11/ M/ S/ GI 1).

"I have to teach a curriculum that I know does not suit my students mentality ...still, all I have to do is to teach it as it is... so students can understand it... I don't look for it serving students' needs or not ... that is not my job" ('Perry A' ID 7/ M/ S/ II).

"In school we should not get to issues outside the frames of the curriculum..." ('Perry A' ID 7/ M/ S/ II).

"Intelligent students are clever and enthusiastic... they understand me quickly... unlike those who are not..." ('Perry A' ID 3/ F/ S/ II).

"They're [students] *always annoying with their disruptive behaviours... they simply don't want to sit and listen to what I have to say... They disrespect teachers"* ('Perry A' ID 7/ M/ S/ II).

It is worth noting that, in many cases, teachers' initial responses to some questions revealed an overt agreement with 'Perry C' thinking. However, further probing unveiled the use of 'Perry C' descriptors to mean what is, in fact, a 'Perry A' belief.

For example, a secondary male teacher said, *"Students' understanding the meaning of information is crucial for learning to take place"* ('Perry A' ID 9/ M/ S/ GI 1). The type of '*learning*' he meant was in essence focusing on memorising concepts, topics, and skills. '*Understanding*' in his perception is defined by doing well on exams and '*meaning*' refers to students' demonstrating what the teacher is concerned about and looking for.

A secondary female teacher said, *"...I think that the whole point of education is to develop students' thinking...students' future counts on that"* ('Perry A' ID 4/ F/ S/ II). When it came to defining '*thinking*', her understanding of it was similarly limited to memorisation. Her view that students' future counts on that is because *"Smart kids get better chances"* as they can do well on exams and stand better chances in going further in their education to University level and ultimately perhaps get a prestigious job.

A primary female teacher said, *"I believe that it is very important to develop my students' thinking... I feel so proud that I can teach my classes how to think"*. When asked to evidence that in her practices, she added, *"all my kids could recite all the mandated multiplication tables, songs, and verses of the Qur'an... many of them even were selected to represent the school and participate in Governerate school-wide competitions* [academic competition set on various levels (schools, Governerate, and nation wide) to test students' knowledge of the taught subjects]*"* ('Perry A' ID 5/ F/ P/ II). 'Thinking' is, yet again, defined in terms of memory and recall – on the personal and the official levels.

A secondary female teacher said, *"I think that there is nothing that is absolutely 100% true or right..."* ('Perry A' ID 3/ F/ S/ II). However, when asked about her classroom practices

to implement this belief, she added *"In life outside school... in social life... yes... but certainly not in Mathematics. There is always one right answer and it is the student's role to find it out"*.

Identification of 'Perry B' Thinkers in the Interviewed Teachers

In many respects, teachers who were identified as 'Perry B' thinkers shared the authoritative characteristic of 'Perry A' teachers. Nonetheless, their acknowledgment of multiplicity was evident in their attempt to use more complex materials focusing on creating meaning and ensuring understanding. In a highly structured learning environment, these teachers created opportunities for students to engage in learning. Students were encouraged to participate in various activities that were teacher-prepared and orchestrated. In doing so, the role of the learner was more accentuated than that described by 'Perry A' teachers. Peer learning was valued more than in 'Perry A' classes. However, they expressed concerns with disruptive behaviour that failed to maintain their pre-set plans. Teachers' planning was structured within the parameters of the objectives and the content of curriculum to which students' purposes appeared secondary. Though in many aspects they seemed to realise multiplicity, their approaches were still bound by the demands of the teaching schedule and assessment.

Sample interview transcripts typical of these views are presented next. More of their views and quotes will be revealed throughout the subsequent presentation of results.

"I always try to pick up ideas for activities to teach a certain topic... I always consider what students like..." ('Perry B' ID 2/ F/ S/ II).

"I want to make it [the curriculum] *interesting and engaging as much as possible... I try my best to make use of a wide variety of resources in teaching the content... so students would be able to understand it better..."* ('Perry B' ID 6/ M/ S/ II).

"...I like my students to be interested in what I say... I encourage them to participate... I allow them to talk with each other when group work is used... I sometimes let them choose their peers as well..." ('Perry B' ID 6/ M/ S/ II).

"... no never considered involving them [students] *in the planning* [of classroom teaching activities]*...there is not enough time for that...besides I think I am in a better position to know what they need...perhaps more than they do..."* ('Perry B' ID 2/ F/ S/ II).

"... all the effort I do in the classroom and what students do throughout the year is dependant on them [exams]*..."* ('Perry B' ID 10/ M/ S/ GI 1).

Identification of 'Perry C' Thinkers in the Interviewed Teachers

'Perry C' teacher identification was unproblematic. This is because the answers from the interviewee were so distinctive. The beliefs of this interviewee were that learning should empower and challenge students to think about their ideas, learning, and life. In this

teacher's science classes, the focus was on students' needs and interests and these were built when and where possible in lesson planning. This particular teacher stated

"I always see the curriculum as a huge amount of possibilities... Everything seems to link with each other in my head and that what I always try to do in my classes... I find that interesting and would like my students to feel the same way too... I try when possible to give students questions that help them to want to know more and to try to find out more... I always see this as the beginning not the end of learning..." ('Perry C' ID 1/ F/ S/ II).

This teacher was eager to learn more about both science and the teaching of science. Inspired by the students' fascination with computer games, she is studying for her MSc degree. Her topic is concerned with designing computer software that aims at developing students' high-order thinking skills and creative abilities through the teaching of science.

Her use of teaching approaches incorporated both modes of 'Perry A' and 'Perry B' thinking. She also focused on problem solving as the primary tool through which she was able to motivate students and create interest in the topic to be studied.

"... one tip I learned through my experience... it helps me to draw students attention effortlessly... I give them a problem... a problem I created from the T.V. news, from their popular cartoons... anything... believe me anything will work if you see them from this aspect... my kids become quite interested... talking of answers, of what they still need to know to understand how to solve it... this method proved 100% success" ('Perry C' ID 1/ F/ S/ II).

There seemed to be a degree of spontaneity in her classroom arrangements. She seemed to be carrying two agendas: covering the mandated curriculum (which is the dominant one), and covering the topics her students wanted to pursue (despite the fact that these were not included in the mandated curriculum). The latter is fully discovered in the 'science activity group' she runs, as an extra curricula activity.

"... when any potential activities are raised in class... I tend to fully pursue them through my Science Activity Group...it is because there is not enough time for all this... there are also a lot to teach... [in the mandated curriculum]*"* ('Perry C' ID 1/ F/ S/ II).

Compared to others, discipline and maintaining control were of less concern to her. It seemed that being able to motivate and truly engage students resolved that for her.

"... the beginning of each term is a real challenge to get the relationship with students 'right'... to build up the trust and respect... once established, the whole nature of the classroom changes... Discipline becomes not an issue... I am amazed at myself and as to how this works..." ('Perry C' ID 1/ F/ S/ II).

In talking about students' ability, her approach was consistently developmental rather than judgemental. She kept stressing the importance of developing students' critical and

creative thinking. She had a strong belief that students' abilities emerge only if they are given the right circumstances.

Having identified teachers' Perry thinking positions, the next section will delve deeper to understand their perspectives on why they believe and teach the way they do.

11.2.2 Teachers' Perceptions of the Underpinning Reasons Behind 'Perry A and B' Thinking Preferences

All of those interviewed felt strongly that 'Perry A' thinking was the predominant, deeply ingrained traditional culture nurtured and supported in the Egyptian system. The interviewed teachers portrayed the educational system in which they operate as one that structurally enforced and consistently reinforced 'Perry A' thinking.

Nonetheless, a clear pattern of differences amongst the perceptions of teachers at Perry's various positions were noticed in how they go about their perceived reality and interpret their beliefs into practices. These differences will be highlighted and discussed as they shed light on genuine issues that need to be addressed *if* fostering 'Perry C' thinking is to be adopted as the norm.

Seven themes or influences were detected from the interviewed transcripts that helped to understand better how teachers come to prefer 'Perry A' and 'Perry B' thinking. These themes and their subsumed categories are presented next (Figure 11.1).

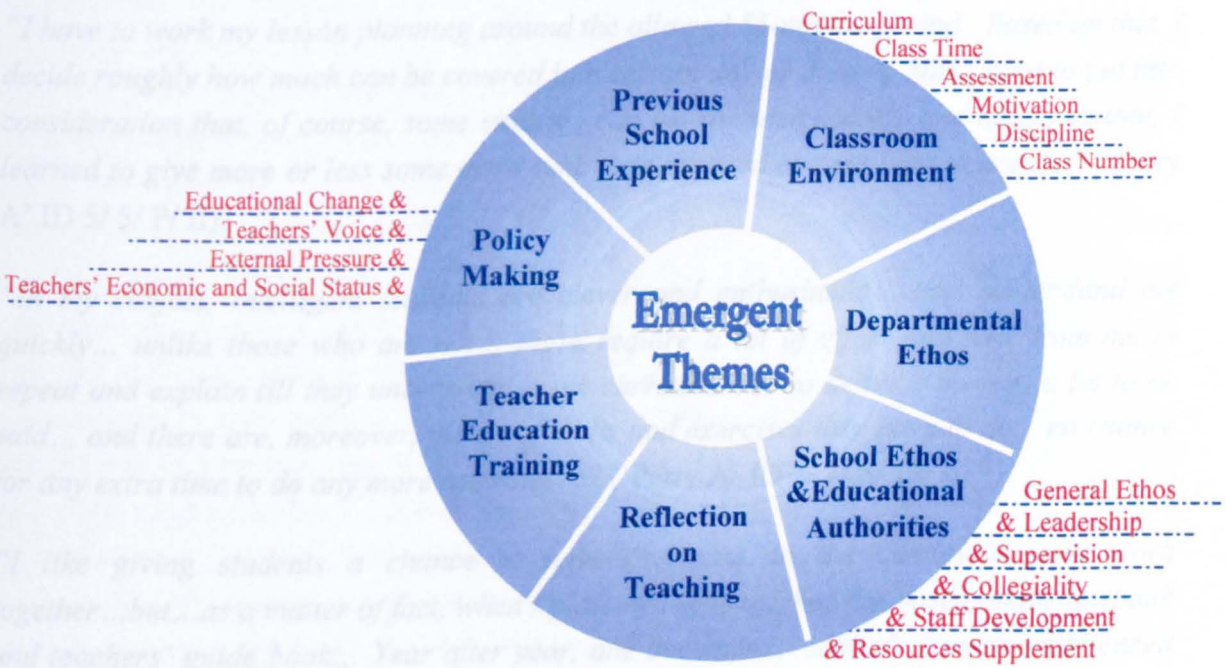


Figure 11.1: Interviews Emergent Themes and Categories

Theme One: Issues on Classroom Environment Level

The first influence related to the nature of the teachers' classroom teaching environment. According to those interviewed, the issues that had impact on the classroom environment were: the mandated curriculum, time constraints, the nature and role of assessment, class numbers, students' motivation, and discipline. It is worth noting that the issues discussed in this theme were raised by the great majority of the interviewed teachers both in the group interviews and in the individual ones.

Curriculum and Class Time

The interviewed teachers at various Perry thinking positions expressed a sense of being 'overwhelmed' with the huge amount of the curriculum content they had to teach. They were expected to follow a timetabled schedule where they finish teaching certain units by set deadlines. Planning for teaching the topics involved accounting for the 55-minute orthodox period time. The content quantity and time pressures seemed to colour their decision in planning their lessons and affect their classroom practice. Adhering to and accounting for these constraints were closely supervised. The number of teachers who identified with these views is 'eighteen', that is all of those interviewed.

Sample interview transcripts typical of 'Perry A' teachers' views are

"There is a large number of topics to be covered... No way... No chance could be given for students to do anything more than what they should do... There is not enough time. It is as simple as that." ('Perry A' ID 11/ M/ S/ GI 1).

"I have to work my lesson planning around the allowed 55-minute period. Based on this, I decide roughly how much can be covered in a certain day or a week. Still I have to put into consideration that, of course, some students can get the idea quickly and others cannot, I learned to give more or less some extra time than planned in case I get to need it" ('Perry A' ID 5/ 5/ P/ II).

"In my subject, intelligent students are clever and enthusiastic... they understand me quickly... unlike those who are not... those require a lot of effort and time from me to repeat and explain till they understand... the curriculum is so dense... there is a lot to be said... and there are, moreover, plenty of drills and exercises they have to do... no chance for any extra time to do any more activities..." ('Perry A' ID 3/ F/ S/ II).

"I like giving students a chance to have an input in the curriculum and work together...but...as a matter of fact, when I plan my lessons...they are based on the textbook and teachers' guide book... Year after year, one becomes... sort of ... more experienced and you would know how much time you need to teach a certain unit... I know that I should not be saying that but in new year planning, I simply copy the stuff I had from previous years to my new notebook... most of teachers do that actually... There are lots to cover and it took me quite a time to create a routine that works within the time limitations I have... No much time for experimenting, I'm afraid" ('Perry A' ID 12/ M/ S/ GI 2).

Sample interview transcripts typical of 'Perry B' teachers' views are

"I always try to... I always consider what students like...for example... in one lesson... I wanted to introduce students to the 'sentence structure' in an untraditional way.... I wrote a play with the sentence being the hero character... the mum and the kids are the subject, verb, object...and so on. I tried to encourage students to act it out so that they can be involved...and concentrate and remember it more... I don't always do that... I here and there try to do such activities when I am okay with time...the first reason is ... because the quantity of what has to be taught overload you...besides I need so much time for the preparation as well... " ('Perry B' ID 2/ F/ S/ II).

"Yes, I did them [the previous mentioned activities] *all myself...they just act them out with me...they quite like it actually...no never considered involving them in the planning...there is not enough time for that...besides I think I am in a better position to know what they need...perhaps more than they do... "* ('Perry B' ID 2/ F/ S/ II).

"I want to make it [the curriculum] *interesting and engaging as much as possible... I try my best to make use of a wide variety of resources in teaching the content... so students would be able to understand it better... I do that when I feel that I am ahead of time or when my schedule can afford a bit of delay...at the beginning of my career, I was a bit enthusiastic and may be had less responsibilities, I used to take extra classes when another teacher is absent or so on... but now I don't think I can do that as much as I used to... I only try to introduce teaching aids and other activities where possible and when there is enough time... "* ('Perry B' ID 6/ M/ S/ II).

Sample interview transcripts typical of 'Perry C' teacher's views are

"I always see the curriculum as a huge amount of possibilities... I get so many ideas from anything I do... I sometimes would stay up most of the night planning, making up stories, creating activities that would help me bring the curriculum to life...you know... when I cook... or watch TV... or read newspaper or any book... or from talking with my kids...I without being aware of it...tend to link such things to the curriculum and use this to form the basis of my classroom activities... Everything seems to link with each other in my head and that what I always try to do in my classes... I find that interesting and would like my students to feel the same way too... I try when possible to give students questions that help them to want to know more and to try to find out more... I always see this as the beginning not the end of learning...you have no idea how students react to that...they love it... they give me back creative stuff ...things that I would not expect... they would surf the internet, go to the street and take photos of things that were relevant to the topic... which was about pollution and the environment... My enemy with this is time...when any potential activities are raised in class... I tend to fully pursue them through my Science Activity Group...it is because there is not enough time for all this... there are also a lot to teach... it is beyond your control...you need to follow certain sequence and within a certain time... the monthly exams rely on that and it would be unfair to put students in a situation when they are faced by questions they know nothing about... " ('Perry C' ID 1/ F/ S/ II).

"I think that the curriculum as it is limits students abilities rather than developing it... how would you expect a first year secondary student, for example, to study fully stuffed 16 subjects...students end up having to study by heart everything from A to Z, if they can ...put it in exams and that's it...they begin their next year with absolutely nothing in mind...I think as well it is because they can see no importance or relevance for what they learn and real life... it is my role to help them find out an answer to the question 'why should we learn that? What is the point of it anyway?'...I think if a teacher believes in that, he will do his best to let his student know that what they learn in school is connected with life outside school... " ('Perry C' ID 1/ F/ S/ II).

"... the start of every year is like beginning from scratch... students don't remember anything they studies before... something tells you that it is not natural... what they learned before was not made as part of them... may be it is the way the curriculum is designed... it does not flow... I don't know" ('Perry C' ID 1/ F/ S/ II).

It was clear from the teachers' responses that the mandated curriculum has a compartmentalised structure. Breadth of coverage over depth is valued. It emphasises memorising facts and teaching for the tests over creating opportunities for students to understand and form concepts. Strict adherence to the structure of the curriculum and the pressure of time are at the expense of giving students the opportunity to explore and explicate concepts linking their learning to real life experiences. Students are likely to end up their academic year with fragmented and surface knowledge that functions as a deposit in memory and lasts till the last minute of exams time.

Nonetheless, clear differences are noticed in how teachers of different Perry thinking positions perceive the curriculum and the way it is taught. Though 'Perry A' and 'Perry B' teachers share feelings of being overloaded with the amount of what they have to teach, there is a noticed difference in how they interpret these beliefs. Whereas 'Perry A' teachers, helplessly, limit themselves within the framework the system provides, 'Perry B' teachers identify more with students' motivation and understanding.

'Perry B' teachers give primacy to students' understanding by employing different methods of teaching. Nevertheless, they – like 'Perry A' teachers – are limited in their perception of knowledge to the provided curriculum content. 'Perry B' teachers, moreover, seem to dominate the planning and structuring of all the activities with little input and engagement from students' part.

The 'Perry C' teacher did not limit knowledge to any single source. The connectedness between her life experiences and her classroom practices was evident. Her interpretation of the curriculum reflected life outside the borders of school. There was a reference to students' needs and interests. Students' realisation of the relevance of what they learn is central to her concept of teaching. Her teaching repertoire is rich and flexible as she is able to implement different teaching strategies used by 'Perry A and B' thinking. However, there is a clear difference in the thinking and the purpose behind it. There are strong

feelings of responsibility and ethical commitment towards students as well as feelings of frustration expressed in her perceptions of the system and the linear way in which curriculum is structured. This is indicated from her say *"... Ohhh... I wish if you instead ask me how I would like things to be... I wish if the curriculum is just tailored to meet the need of students... I feel that I owe those students the right to teach the way I do... but in many times I feel like I am swimming against the flow of the current... I wish if, at least, there is much flexibility given to teachers to cover the curriculum yet perhaps not in the imposed sequence... "* ('Perry C' ID 1/ F/ S/ II).

Assessment

The interviewed teachers at various Perry thinking positions perceived exams as the ultimate goal for what school education is about. Moreover, it was strongly held as the driving force to achieve educational change. Not only did they perceive exams as the framework that determines what they teach, but also how they teach. Nonetheless, there were differences in their criteria of monitoring and assessing students' performance within their daily classroom practices. The number of teachers who articulated views related to assessment is eighteen teachers (i.e. all of the interviewed teachers).

Sample interview transcripts typical of 'Perry A' teachers' views are

"... Exams are very important... basically by grades we can judge who the intelligent and successful students are... it is our role to help students get the highest grades... " ('Perry A' ID 13/ M/ S/ GI 2).

"... Exams are very important... exams and the number of passing students are what determines how successful a teacher is ... " ('Perry A' ID 3/ F/ S/ II).

"In my classroom, my criteria for assessing students learning...[repeating the researcher's question] *...I tend to see how they learn and progress from my year exam reports where students grades throughout the year are cited in details...that gives you an idea about how clever or not the student is...and if they are learning or not ... that's how I do it...I also specify in this report about 15% of the grade to oral questions I ask throughout the month"* ('Perry A' ID 4/ F/ S/ II).

"I've never questioned that before... yes... I think exams are fine... I can see no other way to assess students' learning...this is how things are for quite along time... " ('Perry A' ID 16/ M/ S/ GI 3).

One teacher misconstrued this question. His reply was quite interesting as it shed light on 'Perry A' teachers' perceptions of teaching and schooling.

"I monitor students from their behaviour... If they are well behaved all the time, listen attentively to what I say...if they have a good attendance record... emmmm... if they speak only when spoken to in class, do the homework as and when they're told, for example... I

think good of them... I would give them higher grades than those who are not... " ('Perry A' ID 8/ F/ P/ II).

Sample interview transcripts typical of 'Perry B' teachers' views are

"Exams are very important in the learning process... it tells you a lot about students' abilities... I give grades to students based on different things, actually: their providing the right answer, I also give a bonus grades for those who are creative, neat, active and cooperate in the classroom activities...sometimes I ask students a difficult question and would ask them that whoever will answer it correctly will get 5 grades... that really works and students get very motivated to find the right answer" ('Perry B' ID 2/ F/ S/ II).

"Exams by the end of the month or term is something to plan for and get concerned about... because all the effort I do in the classroom and what students do throughout the year is dependant on them... " ('Perry B' ID 10/ M/ S/ GI 1).

"There is, also, about 15% of the total grades that I can have total control of... I tend to give them to students based on their engagement in answering questions, doing posters, essay writing, and presentation...this kind of activities you know... " ('Perry B' ID 6/ M/ S/ II).

"Yes...I think it [current exam system] *is fair, fine and manageable... especially with the huge amount of students there...* " ('Perry B' ID 6/ M/ S/ II).

Sample interview transcripts typical of 'Perry C' teacher' views are

The interviewed 'Perry C' teacher has a similar view like that of 'Perry B' teachers. However, through her talk, there was a strong sense of frustration with the way the system is laid out.

"Exams here we go again... Ahhh... " ('Perry C' ID 1/ F/ S/ II).

[When asked why she said so?] *"I don't see exams and learning as one thing necessarily... I would like grading and evaluation to be different... as they stand they don't necessarily mean true learning... see for example how many students pass with the highest grades in their school education... I know so many students who passed their GSC* [General Secondary Certificate] *with high... very high grades but couldn't cope in university... I think because they fail to make any use of what they learned in school... to make them better persons"* ('Perry C' ID 1/ F/ S/ II).

"I reckon if exams are approach differently, many things will change about education...I always stress to my students that grades are not as important as understanding... I always say if you understand well you will get high grades... " ('Perry C' ID 1/ F/ S/ II).

"I understand how they learn from the way we interact in the classroom... I see if they are able to make sense of things... understand what is important and focus on it...when they link what they learn with other things in their mind...would that be their everyday life, other subjects ... I mean by that finding new connections and relations... and also by their

questions... what they ask and how they ask tell me a lot...how they react to my comments and how that make them take steps forward towards learning... things like that... " ('Perry C' ID 1/ F/ S/ II).

"I would like to try out different things... may be portfolios, projects, worksheets, peer assessment sheets, ...things like that...it does not have to be about regurgitating the facts and information they learned... " ('Perry C' ID 1/ F/ S/ II).

All teachers at Perry's different thinking positions seem to consider exams as an essential part of the educational system. However, their criteria for assessing students' learning differed. Whereas 'Perry A' and 'Perry B' teachers limited that as the ultimate goal of exams indicated by the grades students get, 'Perry C' teacher perceived it differently. She considered it as a natural constant process that is so integrated in the process of learning. She talked of using feedback more to help students redirect themselves so that they become more capable and competent. While 'Perry A' and 'Perry B' focus on the product seeing exams as 'a culminating activity' and 'a memory teaser', 'Perry C' teacher was more interested in the process of learning.

Students' Motivation, Discipline and Class Numbers

Teachers at 'Perry A' and 'Perry B' thinking positions expressed concerns with behaviour management and relationships with children. Quite often in their talk, they mentioned students not adhering to the set rules and how they devalue the teacher. Disruption of teachers' talk and breaking the rules are interpreted as being disrespectful and wasting learning time for themselves and their classroom peers. Amongst 'Perry A' and 'Perry B' teachers, these issues were raised by thirteen of the interviewed teachers (i.e. eleven 'Perry A' teachers and two 'Perry B' teachers). 'Perry C' teacher has also raised issues related to that theme.

Sample interview transcripts typical of 'Perry A' teachers' views are

"...Few weeks in the new year and you see me saying 'here we go again... students this year are worse that those of the year before'. Year after year, students' quality gets worse. These generations are quite different from how we used to be. We used to fear and respect the teacher. The students of nowadays are completely the opposite. They are always annoying with their disruptive behaviours... they simply don't want to sit and listen to what I have to say... They disrespect teachers" ('Perry A' ID 7/ M/ S/ II).

"At the start of my term, I always set the rules... Disruption wastes everyone's time... I make sure that students' understand that there is 5% of the total grades assigned for good behaviour... If they choose not to obey the rules, they will definitely risk it...that keeps them attentive and motivated to listen to me teaching" ('Perry A' ID 3/ F/ S/ II).

"With the number you have in your class, it is almost impossible to give students any control... I want to keep the class quiet so that they can pay attention to what is being said... I give warning first, I may move students from their desks to another, or ask them to

sit at the back of the class, my last resort would be sending them to the head teacher or ask their parents to come for a meeting" ('Perry A' ID 8/ M/ P/ II).

"Learning in groups??... Please!!... I won't give them this chance... they will talk and talk... they won't understand what it is for... that would be a waste of time" ('Perry A' ID 14/ M/ S/ GI 2).

Sample interview transcripts typical of 'Perry B' teachers' views are

"...I like my students to be interested in what I say... I encourage them to participate... I sometimes ask them to prepare the lesson beforehand and teach it to their peers ... I allow them to talk with each other when group work is used... I sometimes let them choose their peers as well..." ('Perry B' ID 6/ M/ S/ II).

"... Rules have to be set before... students should respect the teacher and their peers... and do as they are told...my classes can be up to 50... if you don't do that... they won't respect you and you'll waste class time... you don't want to appear unable to control your kids... I know a colleague who can keep no control over his classes and the head teacher would come and talk to him and the class about it... I certainly don't want to appear like that" ('Perry B' ID 10/ M/ S/ GI 1).

Sample interview transcripts typical of 'Perry C' teacher' views are

There is a clear link among maintaining order, recognising student interests, and allowing students choices.

"... the beginning of each term is a real challenge to get the relationship with students 'right'... to build up the trust and respect... once established, the whole nature of the classroom changes... Discipline becomes not an issue... I am amazed at myself and as to how this works... I really am... I can now remember a bunch of girls who were known to all teachers as 'trouble makers'... the way I treated them made us like friends ... students are like a thermometer... they can feel how you value them...they reward you back with respect ... Students love me. I can see that and it is quite rewarding... They become more interested and motivated to learn... that really solves it all for me..." ('Perry C' ID 1/ F/ S/ II).

"... I would be happier with small class size... but I would be very unhappy if I just stand there and be satisfied with saying what needs to be said... I want them to have better classes than those I was brought up in... I am keen on given them chances to express their opinions, and thoughts and even share their problems with each others... they can learn from each other just like they can learn from me..." ('Perry C' ID 1/ F/ S/ II).

From teacher perspectives, a clear distinction is noticed between the views of 'Perry A' and 'Perry B' teachers and those of 'Perry C' teacher. 'Perry A and B' teachers were more interested in laying down a rigid discipline policy for their classes with rules and sanctions. They, to a great extent, exercise power and control. From their perspective discipline and control become externally forced and an important issue that is separated from learning.

However, with 'Perry C' teacher, it is considered as part of the nature of learning. It is internally driven and not forced on students. Being respected and held as accountable individuals who have active voices in their learning empower students to live up to what is expected of them. The whole interaction and dynamic of such a classroom turn disruption into a form of energy that holds students' attention and keep them motivated.

Theme Two: Issues on Departmental Ethos Level

The second influence is traced through teachers' accounts of their fellow teachers. Teachers at various Perry thinking positions indicated that their colleagues play a significant role in their daily school life of teaching. Indeed, more than half of the interviewed teachers articulated views related to this theme (i.e., one 'Perry C' teacher, two 'Perry B' and eight 'Perry A' teachers).

Sample interview transcripts typical of teachers' views are

"... It is a comfort to share the frustration we sometimes feel with each other, talk of issues related to school rules and routines and students' behaviour and share lesson planning together... we help each other" ('Perry A' ID 7/ M/ S/ II).

"... together we can discuss problems about students' learning...talking of taking actions to deal with them and may be raising them in the appropriate form to the concerned authority..." ('Perry A' ID 9/ M/ S/ GI 1).

"I share my ideas with my colleagues and solicit their ideas and opinions." ('Perry B' ID 10/ M/ S/ GI 1).

"My colleagues and I... encourage each other... and share many experiences together" ('Perry B' ID 2/ F/ S/ II).

"We always talk about how to enhance learning, how to make it better... how to communicate the information in a better... more understandable way... discuss how students learn and sometimes try things out together and discuss if they work or not..." ('Perry C' ID 1/ F/ S/ II).

Many teachers perceived collegiality as empowering and as a source of relief. The role experienced colleagues played was perceived as important for the novice teachers to help them cope with the new demands of the teaching world. Their role was considered important to help them form their professional identity.

"When new teachers come along... we always try to embrace them... the more expert teachers introduce them to everything they ought to know... they observe the seniors teaching and styles... this is very helpful... because what schools are about is different from the ivory tower of what is taught in university..." ('Perry A' ID 12/ M/ S/ GI 2).

As a matter of fact, the impact of this support seemed as significant as its absence. The 'Perry C' teacher reflected on negative experiences she had early on her teaching career

when she did not fit or conform within their prevalent ethos. Most teachers on her departmental level formed a strong barrier for her to cope and implement what she believes in *"... long ago when I started teaching... I felt like a stranger among them... when they [her colleagues] talk about their plans or even when they talk about kids...I couldn't relate to their ways of seeing things... I used to tell my colleagues about what I have prepared for the lesson and my plans...things like that I was all night thinking of how to teach a certain topic... their reaction used to put me down quite a lot... they used to laugh and tell me 'we understand this enthusiasm but that is not going to last... you wait and see!!'...I later on became more practical as I gained much experience... and found myself forming a group of three who share the same views and can relate to each other may be more ... we used to have frequent meetings...and think hard on how to do something that is beneficial for the kids and the school..."* ('Perry C' ID 1/ F/ S/ II).

Theme Three: Issues on School and Educational Authorities Levels

The teachers' overall perception of the culture and ethos of the school and the requirements they have to meet set by their local authority were influential in forming their thinking positions. In many cases, this had a direct impact on teachers' conception of their roles and what is expected of them, which in turn affect their practices.

Through the interview, teachers were engaged to review the different structures and relationships existing within their schools. Schools ethos, therefore, became more tangible and easily discerned.

Seven categories were detected that are concerned with issues related to teachers' perception of their schools ethos in general, of leadership, of supervision, of their school ethos and collegiality, of their school ethos and staff development, of their school ethos and resources supplement and of the relationship between their schools and the community.

General Perception of Schools Ethos

Collectively, teachers from different Perry's thinking positions generally perceived their schools' ethos to be 'academically driven', putting great emphasis on 'achievement and competition'. Moreover, within the mandated curriculum, emphasis was placed on some subjects more than others. Many teachers commented that in practice 'creative, physical education, home economics and agriculture subjects gradually disappear altogether' being replaced with other *"more important"* ('Perry A' ID 12/ M/ S/ GI 2) subjects like science and math. The reason behind that is *"the grades students get on these subjects won't be added to the total sum anyway..."* ('Perry A' ID 13/ M/ S/ GI 2). Furthermore, these dropping out subjects were perceived as *"good slot of time...two subsequent periods of time ... excellent... I can use them to cover a lot of topics and catch up or revise if I need to"* ('Perry A' ID 3/ F/ S/ II). This particular viewpoint was raised by nearly a half of the interviewed teachers – more specifically by eight teachers (i.e., six 'Perry A' teachers, two 'Perry B' teachers). It was one of the ways with which teachers were able to resolve the

dilemma of the overcrowded curriculum and the limited time available. Even if some were not approved of such a practice, it was nonetheless perceived, at the least, as common and acceptable. Moreover, the ultimate goal of all schools was perceived to be 'good performance in exams' and *"to get as many students through as possible with high grades"* ('Perry C' ID 1/ F/ S/ II). This realisation of the objective schools set for their teachers articulated above by 'Perry C' teacher was unanimously perceived by all of the eighteen interviewed teachers.

Perceptions of Leadership

Principals and local authority personnel were perceived as 'the authority' that exercises control over teachers' careers from their *"remote offices"* ('Perry A' ID 15/ M/ S/ GI 3). For the majority of teachers, their role was perceived as leaders who, exclusively, own decision making and teachers merely as followers of a predetermined set of rules and laws. Some accused them of being out of touch with teachers' reality. A typical view is expressed as such *"He seems to forget what was it like when he was a teacher..."* ('Perry B' ID 10/ M/ S/ GI 1). Leadership is perceived from a hierarchical perspective *"it is just like anything else when one is in power, they become more related to different crowd and set different plans"* ('Perry A' ID 8/ M/ P/ II). Some of the teachers admitted that there were not enough opportunities for nurturing staff collaboration or for participating in decision-making. Indeed this view was expressed by more than one third of the interviewed teachers (i.e. seven teachers).

Nonetheless, some (i.e. four teachers) spoke positively of their principals as they *"meet regularly"* ('Perry A' ID 18/ M/ S/ GI 3), *"chat over a cup of tea"* ('Perry A' ID 18/ M/ S/ GI 3), have *"an open door... where she never sent you back"* ('Perry B' ID 2/ F/ S/ II), and *"listen to you and take your opinions into actions"* ('Perry A' ID 9/ M/ S/ GI 1).

Perceptions of Supervision

What teachers are going to be supervised for was of primary concern to the majority of teachers. Some of the teachers were most animated in their discourse, detailing various procedures and narrating anecdotal experiences of how they perceive ministerial supervision and how they act to meet their criteria.

"What goes on in the supervision now is as simple as that... a mission that is an utter routine... they don't concentrate on the student or the subject... all they care about is to see the teacher filling all his class sheets up to date, his lesson plans are there... all they look for is that students' homework or class work is corrected with a red pen... they don't for one percent care about students abilities or any of that stuff..." ('Perry A' ID 4/ F/ S/ II).

"...This is what they look for... and this is what we make sure they get... if the news that any of them is in school and I am expected to be paid a visit... If any of the students don't have his book, I send him quickly to borrow one from another class... if things are not

marked in their homework... I do some quickly and ask the rest of the class to do the same for each other... it is a silly game and we play around the rules, if we have to" ('Perry A' ID 11/ M/ S/ GI 1).

"I can do as much activities as I like with my students... just between me and them... as long as the doors of the classroom are closed... but when supervisors come... that's a different story... they don't like this stuff... all they focus on is how the blackboard looks like... with the title written, date, etc... they want me to stand up front, use the chalk and talk... they want me to stick literally to what is there in the teacher's guide book... not to step in anyway outside its frame..." ('Perry B' ID 2/ F/ S/ II).

In short, 'ministerial supervision' was criticised for following bureaucratic routines that in essence reinforce teachers' control. It deals with trivial superficial issues and never delves deep enough. In their agenda, such routines were expectations that evidence teacher's 'doing their job'. They expected teaching practices that are aligned with 'Perry A' thinking. Teachers also seemed keen to live up to fulfil their expectations. As a matter of fact the number of those who raised issues that has to do with ministerial supervision was more than one third of the interviewed teachers (i.e., seven teachers).

School Ethos and Collegiality

Probing the positive atmosphere of collegiality they talked about earlier, teachers were unable to name any activity that aims at getting them together. The culture of collegiality was not purposely encouraged as part of their school ethos. It was more as a natural social and cultural process most common in eastern countries. It was also determined by the structure of their schools. In all of them, teachers of the same department have a desk within a shared room. Indeed, the issue of departments as the main context that would help teacher to cope and to form a professional community was raised and discussed in two of the interviewed groups (GI 1 and GI 2). As mentioned before more than half that is eleven teachers of the interviewed teachers articulated views related to this category (i.e., one 'Perry C' teacher, two 'Perry B' and eight 'Perry A' teachers).

One particular teacher talked of a strong lack of belonging to his school department. He compensated that with his needs for feeling of ownership as an indicator of him being considered as a valued member of his school community *"I need to have a class room named after me... just for myself... where I have the keys... to feel that I own it would make me care about it more... and that would benefit the school..."* ('Perry A' ID 14/ M/ S/ GI 2).

School Ethos and Staff Development

Teachers also talked of not having enough meaningful opportunities provided for their professional growth. They admitted that they were not encouraged or offered frequent opportunities to develop their skills. Their mission was *"to get on with the job"* ('Perry A' ID 17/ M/ S/ GI 3). One third of the teachers (i.e. six) have raised this issue. Of the one

says, *"I've been in this profession for about 10 years... this year was my first to attend anything about teaching science"* 'Perry A' ID 4/ F/ S/ II).

School Ethos and Resources Supplement

The majority of teachers criticised the poor resources and facilities available for teaching: not that there were not within schools' possession but because of the bureaucratic policies governing their use. This was indeed a view shared by nearly half of the interviewed teachers (i.e. eight teachers).

"How do you expect us to teach students to be self-independent and we never give them the chance to do anything independently... in biology classes... when we go to the lab, students are not allowed to do anything of their own or touch anything... I set the microscope for them... I get everything ready and all they have to do is to look through it... in our schools things are more precious than students' learning... Technicians get scared that students would break equipments... teachers also have no confidence in students doing things on their own...we got used to seeing them as irresponsible" 'Perry A' ID 4/ F/ S/ II).

The Relationship between Schools and the Community

Throughout their interview accounts, there was no reference to the relationship between school and the wider community or society. Only through social activities that students get to go outside the school. Sporadic efforts mostly organised by individual teachers were the standard theme if community to be involved within the learning process of a certain subject depending on their theories of teaching and their belief systems. Only one teacher drew attention to this category through her interview transcripts of which a quote is mentioned consequently.

"I was crazy about this idea... I took the students out to a trip to Susan Moubarak's Science Centre... It was brilliant... students loved it so much... they had to see the information inside the book alive..." ('Perry C' ID 1/ F/ S/ II).

Theme Four: Issues on Policy Making Level

The great majority of the interviewed teachers (i.e. sixteen) spoke of the educational policies – on a ministerial level – that seemed to affect directly their teaching realities. This included issues that have to do with policy making and educational change, policy making and teachers' voices, policy making and teachers' economic and social status as well as policy making and the external pressures teachers face.

Policy Making and Educational Change

Teachers were quite aware of the role educational policies – on a ministerial level – have on informing the decisions made and the changes adopted. Their words expressed a sense

of cynicism. They criticised its nature, purpose and effectiveness. Their main focus of criticism was the mandated curriculum.

"... Those who talk about educational reformation, they don't realise the concept of comprehensive change... their concept of change is limited to overloading the curriculum with stuff that does not suit students' ability to understand... I came across many topics that I was taught long ago ...I say to myself I used to study that in school but in a far more advanced stage... I don't know on what basis they choose to do that..." ('Perry C' ID 1/ F/ S/ II).

While the 'Perry C' teacher was questioning the rational behind how the curriculum was designed and its suitability for students' mental abilities, another 'Perry A' teacher was satisfied by the overt separation between topics and subjects. He commented, *"... if you come to the curriculum... now it is much more developed than how it used to be five years ago... then we used to teach things about rainforests... as if you are a geography teacher... now what you teach in science is real science... it is because of these recent development... I find myself a real science teacher teaching biology, physics and chemistry..."* ('Perry A' ID 9/ M/ S/ GI 1)

Another point that was raised in many interviews concerned exams. Teachers expressed a realisation that the Ministry of Education's policy about the nature of exams has been subject to recent changes and modifications particularly in the final year of secondary education. Exams started to include questions that require students to employ various thinking processes that go beyond the limits of memorisation. Teachers perceived that this approach is implemented mainly to force changes on their approaches to teaching. 'Perry A' teachers' reactions to that were not as positive as 'Perry C' teachers. Because 'Perry A' teachers believe that exams hold much of their professional identity, they interpret that as a threatening and daunting situation.

"When talking about exams... I feel quite frustrated... I recently feel that exams are one thing and what we teach is another... if only we know about the way exams will be formed, that would have helped us greatly in teaching... the content we teach is a totally different story from what is questioned in exams... exams are far more difficult...this is not how things should be... students should not be asked about something that they did not get in the content and we did not teach to them" ('Perry A' ID 11/ M/ S/ GI 2)

"... Actually exams have changed considerably in the late three years... it started to take a different form... not limited to memorise this or explain that... it gives students problems and requires answers... it is quite tiring to teach students for these exams... we were all used to and happy with the old kind of exams... teachers are really scared... because exams are very important... exams and the number of passing students are what determines how successful a teacher is ..." ('Perry A' ID 3/ F/ S/ II).

'Perry C' teacher's perspective on this was more like a conditional acceptance *"interest in the last year of secondary school exams overrides any other year... exams are designed not*

to be related to the curriculum content... I can personally see cons and pros to this approach... I understand that the main aim is to force teachers to find ways to teach for developing students' thinking... teachers are quite sensitive to exams and the grades students get from that... it is in a way twisting their arms to teach for understanding not memorising... but what is the point of this without giving teachers the adequate training...I think that 'you can not give what you don't have' [Arabic proverb]... " ('Perry C' ID 1/ F/ S/ II).

Policy Making and Teachers' Voice

Moreover, the majority of teachers talked of being underestimated and devalued in terms of not being consulted at all in any decision concerning change.

"I don't think anyone on any level have really asked me what I think should happen or change... I don't think that anyone knows about that better than we do... but that was never considered... " ('Perry A' ID 5/ F/ P/ II).

"We are always under the finger of blame... we're always asked to do things... what and how to teach by people who are in their ivory offices... They know little about what goes on in schools... in real life... " ('Perry B' ID 2/ F/ S/ II).

Nonetheless, their perceptions of approaching change were dominantly a top-down approach.

"There is something fundamentally wrong... many people would share my view... leaders should be more able to comprehend the new nature of life... they seemed not able to comprehend where we are but most importantly they lost sight of where we want to be... " ('Perry C' ID 1/ F/ S/ II).

Policy Making and Teachers' Economic and Social Status

The point of teachers' economical and social status was also emphasised. Some teachers justified their disengagement and poor performance in their classrooms as being related to their perceived underpaid monthly salary. Teachers would seek different ways to exceed their monthly income. This is mainly through moonlighting (finding additional sources of income) and private tutoring for students who need more help in their specific subjects.

"Let's be frank about it... do you have any idea how much a teacher get per month?... the salary a teacher gets is simply not enough... it is too little to last for 10 days a month!!... I've been working since 95 [year 1995] *and what I get now about 300* [EGP]*...spreading raises throughout the year that would be about 400 or 450* [EGP] *... this is not enough to support a family of five members... "* ('Perry A' ID 7/ M/ S/ II).

"I believe that teachers are really forced to teach the way we do... to be honest... teachers' efforts are divided between their normal school routine and the business they do after

school... if you understand what I mean... private tutoring...to keep up with the demands of his family" ('Perry B' ID 6/ M/ S/ II).

"I think that I teach for what I'm paid for... I know it is sad but we cannot hide our head in the sand... this is the reality of our life..." ('Perry A' ID 12/ M/ S/ GI 2).

In their understandings, some teachers perceived teaching in schools merely as being some sort of "business" or "trade". This image prevailed not only to interpret their motivation for teaching but also to subsume students' motivation as well.

"... as to my students... students don't study as they should ... no matter how we advise them to... I always tell them 'you have to study... you need to be an educated person to get a proper job'... 'what does it mean to get a job?'... they answer me... 'how much will we be paid 100, 200, 400 pounds... we can get that doubled if you we get other jobs [like vocational job that is based on apprenticeship and requires no formal training] *they are quite right* [he comments]*"* ('Perry A' ID 12/ M/ S/ GI 2).

Policy Making and External Pressure

Teachers expressed being pressurised and being put under huge amount of stress by various perceived authorities as well as by parents.

"It is quite easy to get trapped in the system..." ('Perry C' ID 1/ F/ S/ II).

"There are limits to what I can do... I sometimes panic from the huge amount of stress placed on me" ('Perry A' ID 4/ F/ S/ II).

"... Huge stress... everyone is after me... judging me... the principal, the supervisor, and even parents... they don't check and help their students in their studying and yet want their kids to always get the highest grades..." ('Perry A' ID 5/ F/ P/ II).

"... It is all about grades... this is what we understand to indicate any kid's intelligence... for students to get good grades, their parents are pushing us... constant arguments about their kids' abilities and grades ..." ('Perry A' ID 5/ F/ P/ II).

"In my classroom, I am the centre of the universe... I have to teach... make sure they understand... set monthly exams... correct papers... keep my records updated... correct students assignments...besides school obligations... look! This is for a number of classes and each has many students... too much... you still have a family, kids, and above all I don't want to get divorced [she laughed]*... too much to do..."* ('Perry B' ID 2/ F/ S/ II).

Theme Five: Issues Related to Previous School Experiences

At various points during the interview, some teachers – more specifically one third (i.e., six teachers) – mentioned previous school experiences. 'Perry A' and 'Perry B' teachers focused on their teachers, how they used to behave and teach. Such experiences seemed to

write their personal scripts of the role of 'the teacher' engraved in their long-term memory and to which they subconsciously adhere.

"... Till this moment... I am one of those who... when standing on the blackboard... I can get a flash back on one of my teachers... I can see me explaining the lesson exactly as he used to do... dividing my writing on the backboard exactly the same way as he did... Mr. XXX [mentioning his full name]... *God's mercy on him... "* ('Perry A' ID 7/ M/ S/ II).

"... I used to look up to my teachers... they seemed to have an aura of glory about them that made me tremble from inside... I always wanted to be like that and wish if students nowadays treat us as such" ('Perry A' ID 14/ M/ S/ GI 2).

'Perry B' teachers were perhaps more aware of the unconscious effect of these experiences on their teaching practices as one teacher puts it,

"While teaching... I always remember my teachers and how they used to teach me... some of them used to do things that really upset me... Though I try not to do the things they used to do anymore with my kids [students in her classes], *I end up spontaneously doing the same things... I don't know why... May be we're used to that... or because this is the way we're brought up... it seems like we unwillingly absorbed their styles... things come out even if we are not quite satisfied with them... "* ('Perry B' ID 2/ F/ S/ II).

The 'Perry C' teacher's recollections were 'student oriented'. She seemed to identify more with the learner's image than with the teacher's one. She talked of herself as a learner, how she used to feel with different teachers, what school experience meant to her then and how she is consciously aiming to change that for students to give them better scripts.

"... I want them to have better classes than those I was brought up in... I am keen on given them chances to express their opinions, and thoughts and even share their problems with others... " ('Perry C' ID 1/ F/ S/ II).

"... I always put myself in my students' shoes... I can remember myself not understanding what is going on... or feeling missed out within the classroom crowd... I used to feel very upset... I used to love and do well in subjects taught by teachers I like... and hate subjects that I hated their teachers... this is why I feel it is important to give time to build up a psychological strong friendly foundation with my girls... " ('Perry C' ID 1/ F/ S/ II).

Theme Six: Issues Related to Teacher Education Training

While interviewing one 'Perry A' teacher, he – with a cynical smile – paused and said, *"You know what... the way this conversation is going... it reminds me of the pedagogical stuff I used to study in university... don't misunderstand me... I used to like them... but to be honest... it was just for university... and that's it... what is important to me now is mathematics and teaching mathematics... "* ('Perry A' ID 7/ M/ S/ II). In his perception, the *"pedagogical stuff"* taught in university is *"the airy-fairy stuff"* that does not prove

beneficial in classroom reality. When asked to elaborate what he meant by *"teaching mathematics"*, his understanding of that was to focus on delivering content-related concepts for students, given enough drills and exercises to prepare students for passing exams.

This segregation between the content of the curriculum and the pedagogy was not a sporadic thing. In other cases, teachers voiced similar views. More specifically one third of the interviewed teachers (i.e. six of them) have articulated issues related to this theme. Comments like *"what we studied in college is one story and what we do in schools is a totally completely different one"* ('Perry A' ID 4/ F/ S/ II), *"the experiences I had in university aren't related to what goes on in school... even school experience... it was of no importance... I can hardly remember anything significant from them"* ('Perry A' ID 13/ M/ S/ GI 2) were quite common amongst teachers. Teacher training courses were perceived of no real value or significant importance in preparing them for their career.

Indeed, in a group of three teachers, the issue of the impact of university teacher education has been questioned. While one perceived it of *"no importance what so ever"* ('Perry A' ID 14/ M/ S/ GI 2), the other commented that *"academic experience may be yes... it was useful... actually also... I think the only practical thing it was good for... was preparing you to stand up in front of a class... it took away the fear you might feel"* ('Perry A' ID 12/ M/ S/ GI 2). The third teacher raised the following issue, *"I don't see it as useful...you want a proof... have a look at teachers who have no educational background like us... they had no school experience... nothing... they teach much better than we do a thousand times... it is the teaching in schools and the experiences they get that make the difference..."* ('Perry A' ID 13/ M/ S/ GI 2). The reason why this particular part of conversation is quoted here is that it was a spontaneous comment that emphasises what the results of the previous experiment have revealed in chapter nine. Interestingly, it seems that some teachers who have educational background perceive others who do not have it as more successful and competent in teaching than they are.

As to their academic knowledge, a couple of teachers expressed dissatisfaction with their level of understanding of some of the concepts they were teaching.

"I've been teaching a lesson in science for so long and I have never questioned if I understand it or not... only after seeing a program on Television ... I realised that it is my first time to really understand it." ('Perry A' ID 4/ F/ S/ II).

"I've seen her [while visiting a colleague in a school] *doing the experiment on magnetic fields...and I went AHH... I was so happy... just like the kids... I never believed that this would be my reaction and I never paid attention to the fact that I've never seen it before...all the activities and the experiments in the book are done theoretically... how sad is that!!"* ('Perry A' ID 4/ F/ S/ II).

In representing their ideas, teachers expressed them with non-formal, colloquial terms. The lack of using precise scientific terms to frame their thoughts while talking about teaching

and learning was quite obvious. Even when some terms such as 'intelligence, thinking' were frequently used, their definition of them – when pursued – were vague, unclear, and mostly reflecting a 'folk' understanding rather than a professional one. Philosophers and linguists conceived of language as basically a means by which speakers convey the content of their thoughts to others (2002). Moreover, Vygotsky (1962) hypothesised that language guides and develops thoughts on and that language is determined by the social context in which an individual exists. If these views are valid, it can be deduced that the university education training teachers had did not make heavy investments in building a solid infrastructure of meaningful concepts and terminology to be used in a way that would help teachers communicate their views in a professional way. This is particularly interesting as this observation was noticed while interviewing undergraduate Egyptian students (Chapter Nine).

Theme Seven: Issues Related to Reflection on Teaching

Through the interviews, teachers held a strong belief that in developing their professional identity "practice makes perfect". Perkins (2002) believed that this is a common 'misconception' that misses out the importance of 'reflective intelligence'. It is believed that "reflective practice is important to the development of all professionals because it enables us to learn from experience. Although we all learn from experience, more and more experience does not guarantee more and more learning. 20 years of teaching may not equate 20 years of learning about teaching but may be only one year repeated 20 times. There are many times when our normal reactions to events are insufficient themselves to encourage reflection. We should not rely solely on our natural process of reflecting on experience, but actively seek ways to ensure that reflection itself becomes a habit, ensuring our continuing development as a professional teacher" (Beaty, 1997). It was, therefore, important to investigate how teachers observe, monitor and assess their own teaching practices. This was particularly important as they perceived the effectiveness of their actual teaching experiences to override their university training. It is worth noting that the views expressed here were drawn from those expressed by more than two thirds of the interviewed teachers (i.e. thirteen).

'Perry A' teachers' understanding of monitoring how they teach was basically limited to both the outcome of students' learning (that is their exams grades) and the reports they get from those who are above them in the hierarchy either on school and local authority levels. Here is a typical quote: *"well!!... when my students get bad grades on their exams or when I have an issue with the school principal or the supervisor... God forbid... then I know there is something not quite right... that makes me think back and see what needs to be done to improve my situation... "* ('Perry A' ID 7/ M/ S/ II)

"... When students go to the principal and complain that they don't understand... " ('Perry A' ID 18/ M/ S/ GI 3).

Unlike 'Perry A' teachers, 'Perry B' and the 'Perry C' teacher – in monitoring their teaching – put more emphasis on their students' learning and the interaction that goes on within their classrooms.

"I sometimes give my kids the space and freedom to question what we did during the class period... how they see what we did... " ('Perry B' ID 6/ M/ S/ II).

"When I get surprised that they really didn't understand what I said... I always question myself... why didn't they?... Who is responsible for this me or them?... what happened?... did I do it right or what?... I always want to know why some understand it better and others don't... especially that all of them are quite clever, I would say... I sometimes give the same lesson for four classes a day... those who get the best of me are those who get it the second or the third time... I pick up from students faces and questions new directions that change my methods period to period" ('Perry B' ID 2/ F/ S/ II).

"I believe that in teaching your consciousness is your judge... it is our responsibility to improve our teaching... I always think of new examples to explain the lesson... new ideas... that help students to understand me better... when I find any new ways to improve lesson teaching... I write them down for the future... from my experiences I believe teaching requires making modifications as I proceed through each period" ('Perry B' ID 10/ M/ S/ GI 1).

Similar to 'Perry B' teachers, the 'Perry C' teacher's responses revealed awareness of a strong ethical dimension in their perception of the teacher's profession. However, her responses identified different perceptions of her role as a teacher than what 'Perry B' teachers did. While 'Perry B' teachers' mission was primarily within the frame of delivering the content in the best possible way, the 'Perry C' teacher perceived herself as a learner who is consistently learning either through her MSc degree where she keeps learning more about learning or through her classroom interactions where she learns from the students.

"I am keen to keep good relationships with my students... through the lesson you can see how things are going... it happens spontaneously... I can see that students can understand better this or that way... in many occasions I tab with them into topics that I know little about but that never worries me... we put them forward as future projects to know about more... " ('Perry C' ID 1/ F/ S/ II).

"the more I learn the more I realise that there is still more to know about... from my readings ... I get strong feelings of commitment for my girls... I want to introduce them to many experiences... " ('Perry C' ID 1/ F/ S/ II).

"I always think of my students as if they are X and X [mentioning her own children's names]*... they are my kids... Allah is the only one who judges my actions... if I am satisfied with what I did, I feel happy"... "I believe it is my responsibility to make my student learn well"* ('Perry C' ID 1/ F/ S/ II).

"I always ask myself why do I teach? Why I want to keep teaching? And how would I want my students to remember me?... these questions help me quite a lot when I feel frustrated or overloaded with work...they are like my own exam questions... I may say... I need to know if I succeeded in doing what I wanted to do or not... " ('Perry C' ID 1/ F/ S/ II).

More than 'Perry A' and 'Perry B' teachers, the 'Perry C' teacher is able to get engaged in thinking beyond the curriculum, to question her objectives and her aims. Using Perkins' (2002) terms, she seems to be able to "pattern, repattern and depattern" her thinking adapting her "mindware" in ways that enable her to be more thoughtful and reflective about her practices to satisfy her expectations of what a teacher is and what s/he should do.

11.3 Discussion

The teachers' responses uncovered a rich assortment of various interpretations of various experiences, relationships, and situations that collectively provided an insight into the larger context within which teachers operate.

From the interviewed teachers' accounts, there is a strong perception that the educational system has institutionalised a way of thinking that is based on the hierarchical power of positions. Teachers' perceived policy makers, at the top of the educational hierarchy, as largely responsible for defining the scope of teachers' capacity to decide and act. What goes on in the classroom, then, is predetermined and teachers are expected to follow certain scripts. Local authority personnel, supervisors, school principals and head teachers have power – by virtue of their positions in the educational hierarchy and the sanctions that are vested in these positions – to enforce teachers to adopt certain approaches and teaching practices that reinforces 'Perry A' thinking creed. Such a perception is presented in the following model (Figure 11.2).

From the above accounts of the interviewed teachers, the centralised top-down approach of implementing educational policies was quite overt and prevalent. Authorities, on the top of the hierarchy, determine what students should learn and design a curriculum that is compartmentalised into subjects each covering vast areas of concepts and topics. The relevance between these concepts and real-life situations are not emphasised. Assessment procedures are set to examine students' learning. The criteria of assessment are mainly bound to students' performance on exams. There is a fixed linear schedule for how and when units of the mandated curriculum are to be presented and covered. Schools' administrators are 'the' authority in control within schools. They are held accountable for fulfilling these plans to the expected standards. Local authority personnel are 'the' authority exercising power over school administrators and teachers. They are held accountable to monitor the whole process and check that everything is conforming to the pre-set framework. Teachers within such a context are held as technicians, they are deprofessionalised and are pressurised to execute what has been decided for them. Provided by a teacher's guidebook, they are expected to act out the prescribed teaching practices. They are held as 'the' authority within the classroom. To make sure that they

achieve the preset objectives, they are provided with 'the control tools' to help them throughout the process, exemplified in a percentage of grades specifically set for managing discipline and behaviour within the class. It is of no surprise, then, that all teachers' comments were academically focused and that developing students' personality, confidence, self-esteem, etc. were hardly mentioned as objectives of schooling.

From teachers' perceptions of their teaching reality, it is clear that core to the educational system's nature, structure, and objectives is 'Perry A' thinking. Despite the Egyptian government's vision of pre-university education reformation targeting the fulfilment of six

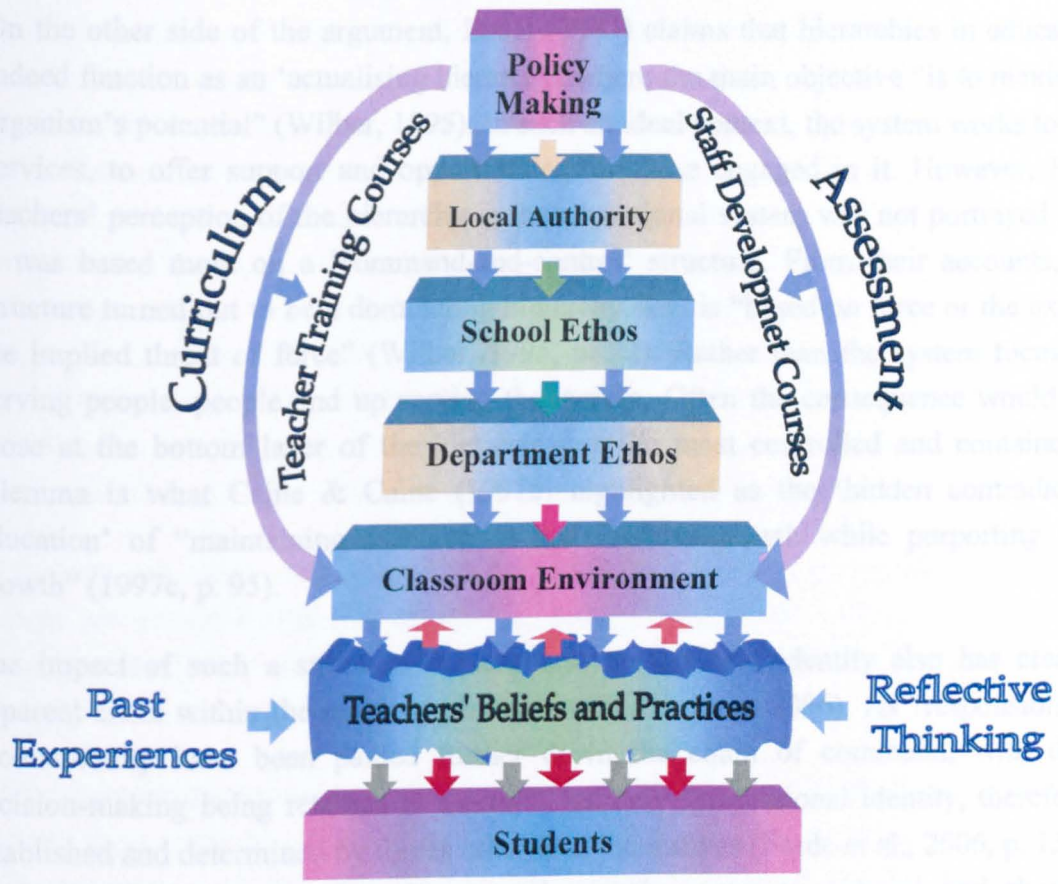


Figure 11.2: The Teachers' Perceived Hierarchy of the Educational System

dimensions (Appendix 11.2), none of this was echoed in the majority of teachers' perceptions, objectives or even language. Nor did they express its strong existence in their schools ethos. The newness of establishing this vision – centring on the 'quality' of education – may explain why it was not evidenced in what teachers said. However, this indeed indicates a true challenge facing the government to improve the system and implement an educational reform. This is because the above model – representing teachers' perception – is, in its essence, a perfect reflection of the industrial mode of thinking (as has been discussed in chapter two): a mindset quite incompatible with what is required for fulfilling the new vision.

Caine and Caine (1997c) state that the main purpose behind structuring any system as such is to provide stability and ease of control because roles and functions are precisely defined. They aver that in such a system "people derive their power and authority from the

positions they hold in the system, and they use that power to sustain the system, by specifying and carrying out responsibilities and activities that these positions define" (Caine & Caine, 1997c, p. 94). However, by functioning in this way, the flexibility and plasticity most needed to cope with the challenges of the modern world are not considered since the system itself "interferes with the capacity to grow, learn, evolve, and adapt to a changing world" (Caine & Caine, 1997c, p. 94). Moreover, without giving teachers enough autonomy or considering them in the process of making decisions, it is believed that their 'professional identity', their sense of agency and of ownership would be strongly embedded (Forde et al., 2006).

On the other side of the argument, Eisler (1987) claims that hierarchies in education can indeed function as an 'actualising hierarchy' where the main objective "is to maximize the organism's potential" (Wilber, 1995). In such an ideal context, the system works to provide services, to offer support and opportunities for those engaged in it. However, Egyptian teachers' perception of the hierarchy in the educational system was not portrayed as such. It was based more on a 'command-and-control' structure. From their accounts, such a structure turned out to be a dominating hierarchy, that is "based on force or the express or the implied threat of force" (Wilber, 1995, p. 22). Rather than the system focussing on serving people, people end up serving the system. Often the consequence would be that those at the bottom layer of the hierarchy are the most controlled and contained. This dilemma is what Caine & Caine (1997c) highlighted as the 'hidden contradiction in education' of "maintaining a hierarchy that inhibits growth while purporting to seek growth" (1997c, p. 95).

The impact of such a structure on teachers' professional identity also has created an apparent crisis within the teaching profession (Forde et al., 2006). As "responsibility and accountability have been passed further down the chain of command, with the real decision-making being retained at the top", teachers' professional identity, therefore, are established and determined by forces other than themselves (Forde et al., 2006, p. 13). This results in creating a distance between those who generate policies and those who implement it, which, in return, would have great influence on actualising governments' visions of change (Fullan, 1993). The effect of this disengagement, Forde et al. (2006) believe, "creates a malaise within the profession and, therefore, within the principal site of learning – the classroom...[that] does not best serve the interests of learners, teachers and communities" (p. 13).

Also implicit within such a structure is what Ball (1990) calls a 'discourse of derision', of waning trust in professionals (Avis, 2003), which relates to perceiving teachers unable to deliver the required standards of teaching and schooling that externally derived standards have to be imposed to ensure the achievement of societies' required goals [cited in (Forde et al., 2006)]. In the Egyptian teachers' accounts, this was captured in the frustration the 'Perry C' teacher feels of being forced to follow a 'Perry A' prescribed structure and approach to schooling.

Two issues of great importance are now raised for discussion. The first is concerned with what exists in the literature about the expected consequences and traits of teachers who work within such a dominating hierarchical structure. The second issue is concerned with the extent to which this was manifested in the current data gained from the interviewed Egyptian teachers. These issues are now discussed.

Caine and Caine (1997c) contend that teachers within such a dominating structure would derive most of their power from the system they work in. They tend to rely largely on others' authority, the parameters set for them and on their position to make learning happen in line with the mandated curriculum. They are not allowed or encouraged to function at any layer higher in the hierarchy than theirs and rarely, if ever, engage in questioning the power inherent in the system. This gradually creates what Caine and Caine (1997c) call 'a resultant state of dependence and compliance' and what Seligman (1975) calls 'learned helplessness'. In these 'downshifting' conditions, the 'flight' responses (Cannon, 1914) are activated to 'depower' (Hopson & Scally, 1981) teachers instead of 'empowering' them. In such a state, teachers revert to early programming or instinctive behaviour and lose much of their capacity to think openly, creatively, and reflectively. They tend to reduce risk taking and be intolerant of uncertainties and ambiguity. Findings from Mackenzie's (1999) study using the Big Five personality traits (McCrae & Costa, 1996) confirm these tendencies. Activating such traits is indeed a direct stab at the heart of what genuine intellectual activities and authentic teaching and learning are about.

In the current investigation, the interaction between teachers' underpinning beliefs and the system has revealed different degrees of commitment to the system. In the following discussion the focus will be on the distinctive contrasts between 'Perry A' and 'Perry C' thinking teachers.

'Perry A' teachers seemed to internalise all of the above downshifting traits. They seemed to draw their sense of professional identity from the whole context in which they work. Their awareness of the rewards and punishment employed by the system strongly controlled their teaching motivation as well as practices. This has been indicated in teachers' efforts to secure their jobs, in their keenness to meet the criteria set for them by supervisors and school principals and in their pursuit to limit their performance to the financial returns they get from their job. This has also coloured their perceptions of exams, discipline, and defined the parameters for their reflection on their teaching (as been show in their comments in the previous section).

They play the same game of control by applying the rules with students through the control they have over grades. Their use of punishments and rewards as extrinsic motivators is perceived not only as justifiable but also as appropriate. Their interpretation of intrinsic motivation was limited to their belief that students should want to study what is thought to be good for them. Such an attribute strongly induces compliance as Kohn (1993) puts it,

> What rewards and punishments do is induce compliance, and this they do very well indeed. If your objective is to get people to obey an order, to show up on

> time, and do what they're told, then bribing or threatening them may be sensible strategies. (p. 41)

Other features of this compliance are manifested in teachers' emphasis on maintaining the preset scripts. They want to be perceived as the authority that knows it all. They limit learning to what is in the textbook. Their teaching practices are informed by what is expected of them and what they will be inspected for. They have the tendency to reduce their ideas, procedures and practices drawing on 'the teacher' figure they built up through their own experiences as learners. If the curriculum does not explicitly address students' needs; develop their thinking skills; relate topic to real life situations, then it is the curriculum designers' responsibility not theirs. Their views of students are limited to the labels of those who have the ability to understand quickly and those who need more time and effort. The parameters of the 55-minutes period directly shape their teaching approaches. Their understandings of why and how students are assessed are confined to conforming to the system's general policy of passing exams with high grades to get more credits for himself and his school. The ultimate goal of education in Egypt is basically driven to secure a future job reflecting indeed the folk perspectives of the whole society.

Throughout their accounts, 'Perry A' teachers exhibited the symptoms of being disempowered by their previous experiences and by the system. Seriously underpaid they are in addition disempowered and their professional development seem to be totally neglected. It is no wonder that over the years they have successfully contributed to the sabotaging of the system by moonlighting (finding additional sources of income) and private tutoring. They do not feel that they can initiate or own change even within the boundaries of their classroom. Their outlook is quite similar to what Rotter (1966) calls an 'external locus of control': they are dependent on authorities above them in the hierarchy. Evident through their interviews is the profound lack of being engaged in genuine reflection. The majority defer to the system, not revealing dissatisfaction with the structure as it is, even when they are critical of specific aspects of it. Instead of questioning the system and purpose of schooling, their mental energy was exerted in trying to cope with what is pre-set, and to be wary and concerned of the consequences of not fulfilling the objectives they meant to achieve. Questioning the system was only mentioned to criticise the introduction of any new changes. In other words, it is to declare them as change resistors. They are quite content with the status quo. This may be because it might suit them best and/or because they did not experience any other and/or because they lack the ability to envision any other scenarios but Perry A's one. They are, in short, totally ill-equipped to live up to the requirements of fulfilling the governmental vision for learning (Zaalouk, 2006).

Caine and Caine (1997c) believe that teachers with 'Perry C' aligned beliefs internalise their sense of authority. They have a belief in their own self-agency, an agency with responsibility (Forde et al., 2006), that provides them with self-autonomy with the least degree of reliance on the system. They rely more on their own judgement as they believe

that they are in charge not because they like to personalise 'the controlling authority' but because of their sense of 'self efficacy' (Bandura, 1992).

To function effectively within the system, Forde (1992) avers that these "personal agency beliefs play a particularly crucial role in situations that are of greatest developmental significance – those involving challenging but attainable goals" (p.124). Caine and Caine (1997c) similarly emphasise the importance of these 'self-efficacy beliefs' for two reasons The first is that they "[free] educators from many of the system's perceived constraints enabling them to introduce new ideas, methods, and approaches, with or without the support of the system" (p. 92). The second is that it takes teachers with self-efficacy to elicit self-efficacy in their students. Deci, Schwartz, Sheinman, & Ryan (1981) research has proved that "teachers who [were] more autonomy oriented [had] children who are more intrinsically motivated... [and] children in their classes [had] higher self-esteem – they felt better about themselves in general and they perceived themselves to be more competent in the cognitive domain – the domain that relates directly to the classroom" (p. 647).

Considering that there was only one interviewed 'Perry C' teacher in the sampled Egyptian group, caution should be taken in generalising this particular teacher's traits. However, being the only representative of 'Perry C' teachers made available, the following discussion is based on considering her as a possible typical representative of this group and on the literature related.

To a great extent, the characteristics demonstrated in the literature have been noticed in the 'Perry C' teacher's account. Though 'Perry C' teachers are aware of the constraints within the system, their reaction to them was opposite to the 'downshifting' effect noticed with 'Perry A' teachers. They choose the 'fight' response (Cannon, 1914). Their internal 'locus of control' (Rotter, 1966) held themselves in position of control to own and initiate change. Their sense of empowerment helped them to take risks, tolerate ambiguity and embrace uncertainties as much as possible.

They were creative in finding ways to work both within and around the system trying to make use of what it offers to achieve their goals. Within the parameters of the mandated curriculum, they were keen to emphasise the relevance of what is taught with real life outside schools. Despite the prescribed topics included in the curriculum and the time constraints, they are able to think of ways that fulfil students' curiosity and interests to know more even through extra-curricula activities. Their sense of self-empowerment was reflected in their ethical commitment to empower students as well. Intrinsic motivation was primary in their conceptions of learning. This was achieved by focusing on meaning in learning through addressing students' needs and interests. The whole discipline and control issue was of less importance. Students' energy is positively redirected from disruptive behaviours to engagement in the learning process. They hardly mentioned anything about rewards or punishment. Because their "objective is to get long-term quality in the workplace, to help students become careful thinkers and self-directed learners, or to

support children in developing good values, then rewards, like punishments, are absolutely useless. In fact, as we are beginning to see, they are worse than useless – they are actually counterproductive" (Kohn, 1993, p. 41-42).

Unlike 'Perry A' teachers, 'Perry C' teachers are constantly questioning the system. They have 'mindfulness' (Langer, 1989) and what Perkins (Perkins, 1994) calls 'reflective intelligence'. This is manifested in their ability to be engaged in genuine reflection on all levels, within their classroom, in monitoring their teaching and in assessing students learning, in questioning their personal objectives, their personal commitments as well as in questioning the policy of schools, local authorities, and the decisions of policy makers as well. This is fuelled by their ability to envision change and their confidence in making it happen.

They, nonetheless, face great challenges in reaching a compromise that would help them satisfy their personal goals and expectations yet within the strict framework pre-set for them. They need an endless supply of enthusiasm and motivation to keep swimming against such a strong current. Within the current system, their pursuit of implementing their beliefs to their teaching practices resembles rolling a stone uphill. Their sense of frustration is quite understandable because their efforts could have been better utilised only if the system was flexible enough to accommodate their beliefs and inputs.

Having discussed the characteristics of teachers in Perry's different thinking positions, it is time now to revisit the model perceived by teachers and presented above (Figure 11.2). The hierarchical structure perceived by teachers does not seem to explain entirely the true dynamics of the whole issue of why teachers end up regressing and adopting 'Perry A' thinking position.

In light of the interviews analysis and the discussion of the relevant literature, two critiques are offered to cast doubt on this 'perceived' model.

The first is that although all teachers agreed on the stress this dominating hierarchy of the system creates on them, teachers' beliefs and practices were not entirely moulded in one way of 'Perry A' thinking, albeit the majority were. The interviewed teachers' accounts have emphasised the point that what goes on inside the classroom is closely related to what goes on outside it but by no means entirely limited to it. The patterns of differences of 'Perry B' and 'Perry C' teachers' beliefs and practices shed light on the importance beliefs play in interpreting the reality of the system. It is because, "Teachers don't merely deliver the curriculum. They develop, define it and reinterpret it too. It is what teachers think, what teachers believe and what teachers do at the level of the classroom that ultimately shapes the kinds of learning that young people get" (Hargreaves & Fullan, 1992, p. ix). In such processes some teachers choose to limit their "development, definition, interpretation" of the curriculum to the minimum of what is prescribed depending totally on the system.

Others choose to defy these limits and act accordingly. Fam* (1999) says, "What counts is not the event but how we choose to interpret the event. You are your choices". The different patterns noticed among teachers can be explained then to be a matter of choice between what Caine and Caine call (1997a) 'dependency on the system' and 'self efficacy grounded in authenticity'.

The other is concerned with the top down implied linearity of the hierarchy perceived by teachers. Given that educators on each layer of the hierarchy have been once classroom teachers, this would imply a two-way influence rather than the linear top down one. Furthermore, by choosing to comply and reinforce the existing system, the majority of 'Perry A' educators and teachers are in actual reality perpetuating the system. The argument that they have been trained in or moulded to this way of thinking either through their previous school experiences, their university training or through the staff training they get throughout their career (Chapter Three) adds even more weight to this self-perpetuation cycle. The evoked set of questions, then, would be how to break this cycle? At what point can beliefs be altered? Would a centralised top down radical change be a must? Would a decentralised bottom-up approach be the answer? It is, in essence, a question of how, when and where to break this cycle?

Breaking this cycle requires change in how individuals perceive the world and make sense of it. A change that is not superficial, technical, or behavioural but rather structural and philosophical that puts individuals' assumptions and thoughts that are taken for granted to question.

In mapping the journey of college students' conceptual change, Perry (1999) – with many other 'cognitive structural' theorists – has provided a framework on how significant changes in epistemologies could happen (Chapter Four). Individuals have a tendency to seek consistency by systematising or organising their processes into a coherent system or structure. This structure embraces all the tacit assumptions upon which individuals' perceive, evaluate and make decisions. To transform these cognitive structures in a way that would accommodate new meanings, disequilibrium, perturbation, or what is known in the literature on attitudes as 'cognitive dissonance' is considered as a necessary requisite. In other words, it is the dissatisfaction with the status quo that is considered as the impetus to initiates change.

Once individuals are cognitively perturbed, they can then decide either to block out the perturbation (thus stifling the opportunity of change); develop a rationale for not dealing with the perturbation (i.e. change does not lie within one's personal power, the benefits of change are not worth the personal efforts or risks?); or take some action which addresses the perpetuation (Davis et al., 1993; Shaw & Jakubowski, 1991). These first two decisions are what 'cognitive structural' theorists describe as irregularities of development and what

*Professor Roushy Fam: A clinical psychologist who had vast experiences of 30 years as a therapist. He used to teach in the Women's Faculty of Arts, Science and Education gathering students in his famous 'round table' to talk and discuss various topics.

Perry elaborates on as escape, retreat or temporising. To choose the third option implies an awareness of the need for change that has to be embraced and developed through collaboration and interaction with others involved in the system (students, colleagues, administrators, policy makers, etc.) to envision various options and alternatives.

Shaw & Jakubowski (1991) believe that dissatisfaction and awareness of the need of change do not guarantee action whereas enthusiasm and making personal commitments do. These empower individuals as they get them engaged with their repertoire of previous knowledge, experiences, opinions and beliefs. Successful engagement can indeed turn what individuals perceive as "constraints" to be perceived as opportunities for "personal constructions" (Davis et al., 1993, p. 633). The next step then would be creating a new collective vision as a broad framework of targets and goals shared by all (Caine & Caine, 1997a, 1997c; Fullan, 1993). In developing this communal vision, Shaw & Jakubowski (1991) aver that the focus should be on thinking about the characteristics of schools where learning for thinking and understanding takes place, instead of focusing on the constraints as to why this vision could not be achieved.

Shaw & Jakubowski (1991) believe that creating the vision is key for the change process but it still does not imply change. Individuals involved in the educational system have to project themselves into this vision to ensure change. In doing so, images of their roles and what they can do will be envisioned and defined which will ensure their personal ownership of change. Throughout all of these phases, reflection is believed to be an integral part of the change process (Shaw & Jakubowski, 1991). Through reflection, deeper understandings can take place that would inform, guide and may redirect the whole process. The conceptualised phases discussed above spirally repeat themselves again and again on various levels (Figure 11.3).

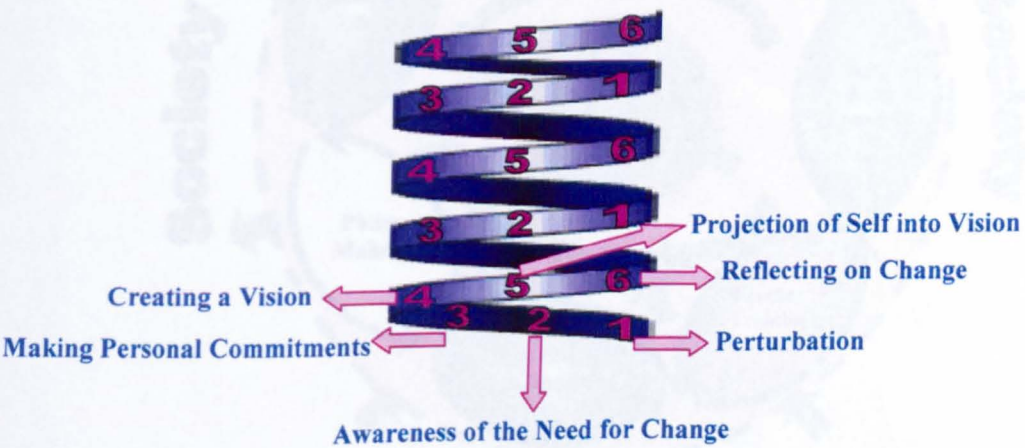


Figure 11.3: Conceptualisations for Educational Change

It could be argued then that a new mindset for a new model alternative to that perceived by teachers is required. As Fullan puts it what "we need, in short, [is] a new mindset about educational change" (1993, p. 3) that will help us "to internalize fundamentally new ways of conceiving of and responding to the situation in which we find ourselves" (Caine & Caine, 1997a, p. 13). Any proposed mindset should, therefore, conceptualise change as creating a shared cause and vision that is based on perceiving the system as a 'dynamic,

complex and open' (Wheatley, 1999) conversation among all of those who are engaged in the educational endeavour (Figure 11.4). Creating this culture is essential for effective educational policy. It empowers everyone involved, ensures equity and trust. 'Perry C' teachers have envisioned aspects of it by saying, *"... creating new laws, and given public speech is dead easy... people would find ways to easily work around the imposed law... but executing change real change is very difficult... we need strong leadership... we need well - prepared, enthusiastic people and more facilities and equipments... there is a strong need for raising awareness, creating a passionate psychological foundation that is enthusiastic to embrace change... something like Susan Mubarak's* [her Excellency Egypt's First Lady] *project on 'Reading for All'... it took her twelve years to create the right atmosphere... "* ('Perry C' teacher).

One of the most important understandings this model embraces from interviewing teachers is the recognition and appreciation of the interconnectedness and wholeness of the themes depicted throughout teachers' accounts. Though each theme is powerful in its own right, an effective educational system demands perceiving these themes as an interlocking and mutually reinforcing network that exerts a cumulative impact on teachers' beliefs and ultimately teaching practices.

Figure 11.4: An Interconnected, Dynamic, Complex Open Model for the Educational System

11.4 Conclusion

The purpose of this chapter was to probe and investigate the reasons behind the revealed belief profile of the Egyptian teachers group. Results from Chapter Seven and Nine have shown the Egyptian teachers showing a pattern of development that is distinctively different from the one anticipated by Perry (1970) in his model as well as from their Scottish counterparts. Through conducting interviews, various themes have been identified and presented. These themes taken collectively have given insights into important understandings of why the different positions of the teachers have come to be adopted.

From teachers' perceptions, it is clear that the educational system in Egypt nurtures and supports the acquisition and development of 'Perry A' thinking. Results from the interviewed teachers, nonetheless, have revealed differences between how the beliefs of teachers from various Perry's thinking positions bring themselves into play in the daily teaching practices of their classrooms and schools. These findings have been discussed and teachers' perceived model have been analysed critically.

The next investigation looks into the extent to which Egyptian teachers believe the themes identified here are of importance. In other words, which of all these themes they hold as the most influential and the most strategic leverage points for effective educational reform.

To do that, a wider population of the Egyptian teachers – that goes beyond the limits of the eighteen teachers interviewed here – was surveyed. It was also of great interest to investigate Scottish teachers' perspectives on these issues. Both studies are presented in the next chapter.

Chapter Twelve

Teachers' Perceptions of Educational Change: Phase Three

12.1 Introduction

In the previous chapter, the interviewed Egyptian teachers identified various themes that they perceived to affect their beliefs formation and the way they interpret them into teaching practices. These themes seem to function either as catalyst facilitators or as inhibitors for teaching for understanding and addressing students' thinking and development. Because these results were limited to a small number of the Egyptian teachers, the aim of the current investigation is fourfold:

- To examine the generalisability of the themes in a broader Egyptian context by surveying a larger sample of Egyptian teachers.
- To examine the applicability of the themes to the Scottish context by surveying a large sample of Scottish teachers.
- To identify the relative importance of the themes in each context.
- To examine how positive Egyptian and Scottish teachers are about achieving educational change.

12.2 Study Instrument

For the purposes of this investigation, a questionnaire was developed. Reasons behind the choice of a questionnaire as a research method has been discussed earlier in chapter six. The following sections describe: the construction of the instrument dimensions and items, content validity and reliability and a description of the instrument itself.

12.2.1 The Construction of the Instrument's Dimensions and Items

The instrument included the themes identified from the interviews with the Egyptian teachers (Chapter Eleven). In constructing items, Fullan & Hargreaves' (1992) book 'What's worth fighting for in your school?: Working together for improvement' was also consulted.

An initial draft of 55 items was considered by two experts from the Faculty of Education at Glasgow University both of whom have long experiences of the themes being explored along with extensive classroom experience. Based on their feedback, items were reduced to reach the final form of 49 items.

12.2.2 Instrument Content Validity and Reliability

General issues about a questionnaire's validity and reliability were previously discussed in chapter six. To ensure this instrument's validity, these 49 items were translated into Arabic

(an Egyptian interpreter who possesses good command of both languages was consulted in this process) and both versions were submitted to a panel of seven judges: three Arabic and four Scottish graduate students studying for their doctoral and masters degrees for comment. Their feedback was positive and there were no modifications required.

The final draft was piloted as a pre-test. The pre-test process was conducted with a small group of the targeted population (ten Egyptian teachers and two Scottish ones). Three major objectives were sought from this pre-test. The first was to ensure the readability of the questionnaire. The second was to have an estimation of the time required to complete filling the questionnaire. The third objective was to explore teachers' general comments on the discussed issues and to investigate if they would like to add or remove anything to the factors that facilitate or impede them from teaching for thinking and development. Results from the pre-test were quite satisfactory on all of these concerns. It took the participants about 20-25 minutes to complete the whole questionnaire. Their feedback was positive with only minor modifications carried out to the instrument.

As to the reliability of the questionnaire, Reid's (2006b) suggestions were taken into consideration. Items were carefully designed to minimise any ambiguity, to be of moderate difficulty, and to be within a reasonable length. Moreover, large samples were surveyed. Because each item was considered as an issue on its own, internal consistency was, not required (Reid, 2006b). More discussion about that is available in chapter six.

12.2.3 Instrument Description

The resulting questionnaire (Appendices 12.1 and 12.2) consisted of the following:

- An initial part specified for providing personal information (optional).
- Part I contained the majority of the instrument's questions. It is divided into five subcategories. Each represented one of the themes identified from interviewing a sample of the Egyptian teachers' group. These subcategories were concerned with teachers' perceptions of issues related to their classroom teaching, the curriculum they taught, the assessment procedures they used, issues related to their departmental colleague ethos, and that of their school and their local authority. Each consisted of a varied number of five-point Likert scaled statements. Collectively this part contained 44 statements.
- Part II consists of five questions on issues related to teachers' perceptions of educational reform. The first three are designed to give teachers a number of choices from which they are to select and give priority. The remaining two were designed in the form of a three-point Likert scale question. In one of them, a place was provided for teachers to elaborate more on their choices.

12.3 Study Sample

The numbers of those participated in the current investigation from the Egyptian and the Scottish samples are presented in the following table (Table 12.1).

	Number of Teachers
Egyptian Teachers	196
Scottish Teachers	78

Table 12.1: Number of Surveyed Teachers

12.4 Administration of the Instrument

The questionnaire was administered to teachers from the same cohort that participated in the previous phases of this study. Participants voluntarily agreed to take part in the study. The procedures concerning data collection were initiated after obtaining the ethical approval from Glasgow University.

12.5 Statistics Procedures Employed in Data Analysis

The purpose of the current cross-cultural investigation is not to compare rigorously both contexts, the Egyptian and the Scottish, to each other. This is simply not possible as the intervening variables are beyond any experimental control. The ultimate goal was to find any interesting broad patterns that might inform the search for effective teaching, learning and schooling. To achieve this, descriptive statistics are used to summarise and describe the data obtained from the two groups. Data analysis is based on observing the overall general patterns within the distribution of the percentages of teachers' responses to each item. Aggregating the sum total of teachers' percentages in 'SA, A' and 'SD, D' positions was also used to get a clear pattern of where the majority of teachers are.

12.6 Elaborations on Data Presentation

In the following section, both Egyptian and Scottish data is discussed in turn for each category of the first part of the questionnaire. The same applies for the subsequent set of questions. Data is presented in percentages and whole numbers for clarity. The first part of the questionnaire is illustrated in the following table (Table 12.2).

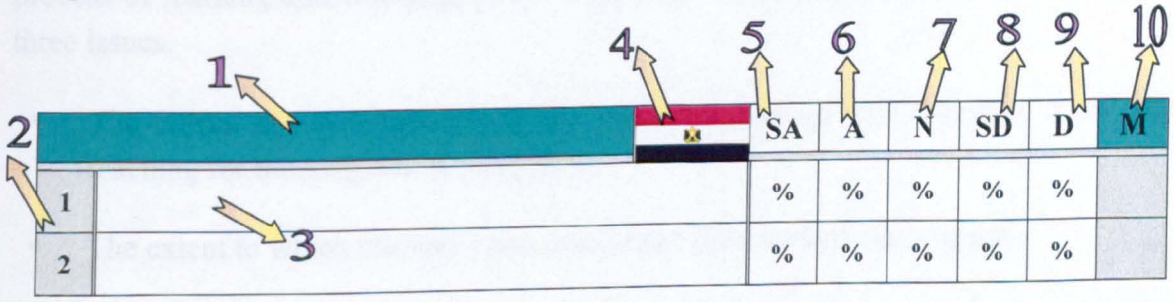


Table 12.2: An Example of How Data is Presented in the Experiment

The *Numbers Key* of this table is presented as follows:

1	Category title	6	Agree
2	Items number	7	Not sure
3	An item statement	8	Strongly disagree
4	Egyptian Sample (Egyptian national flag)	9	Disagree
5	Strongly agree	10	Missing responses

In the second part, teachers are asked to choose from a number of options giving priority to selected few. In presenting this data a colour code is used of

- to indicate the choice that was the first in order,
- to indicate the choice that was the second in order,
- to indicate, where applicable, the choice that was the third in order.

12.7 Results

In this section, the data gathered from the Egyptian and the Scottish contexts are presented and briefly discussed. Egyptian and Scottish data related to each category are analysed respectively before being brought together and summarised where possible. In doing so, a detailed comparison is not the ultimate objective. The focus, nonetheless, will be on the issues that show interesting, consistent or inconsistent broad patterns.

In considering the emerging patterns, it is important to note that statements of the questionnaire's items are constructed either positively or negatively. Therefore, to comment on a group of statements that include positively and negatively constructed items, the phrase 'and/or' in a sentence like "*the sum total of those in 'SA, A' (**and/or**) 'SD, D' positions*" will be used.

Part I – Question 1: Issues Related to Classroom Teaching Activities

Teaching is a complex and challenging task. To ensure its effectiveness, teachers are expected to create conditions that support the fulfilment of the targeted principles. To explore the potential impact of teachers' classroom related activities on the quality of the process of learning and teaching, a set of questions were asked that aimed at identifying three issues.

- The extent to which teachers are aware of the prerequisites necessary to facilitate teaching for thinking and development.
- The extent to which teachers consciously plan their actions and practices.
- The extent to which teachers participate in activities that promote reflective teaching.

Part I Question 1 (Egyptian Sample)

	In my classroom teaching...	SA	A	N	D	SD	M
1	I have a clear plan about developing the thinking of pupils.	30	52	11	7	0	0
2	I am aware of the prerequisites needed to develop the thinking of pupils.	25	58	12	6	0	0
3	I find it difficult to address the different developmental stages of pupils.	22	33	16	24	4	1
4	I feel confident in my ability to support pupils when I introduce new ideas to them.	54	35	6	3	0	2
5	I do not find it easy to model consistently how to question things.	15	37	19	19	4	6
6	I consistently encourage pupils to think of various points and answers to any issue.	43	37	12	5	1	2
7	I did not receive good enough training to help me plan my lessons in a way that addresses thinking as well as content.	14	31	7	29	17	2
8	I rarely discuss with my pupils how to make learning and teaching better.	12	26	14	31	14	2
9	I rarely invite my colleague to attend my classes and help me reflect on my practices.	16	33	21	22	6	1
10	I often give pupils the time and the chance to explain and analyse their thinking.	34	40	16	8	1	1
11	I record (e.g. video or tape) some of my classes to go through my practices again.	7	15	16	37	24	1
12	I consistently use language in a way that encourages my pupils to think.	34	50	10	6	1	0
13	I help my pupils to understand that the ultimate goal of learning is the development of thinking.	41	37	12	6	2	2

Looking at the table, a clear pattern of responses emerges where the majority of teachers respond positively on most of the discussed issues. This indicates that they perceive themselves as possessing high self-efficacy in managing their instructional practices and their classrooms environments in a way that fosters thinking and development. Typical examples of this are questions 1, 2, 4, 6, 10, 12 and 13. In all of these issues, the percentages of teachers who have positive perceptions [*the sum total of those in 'SA, A' and/or 'SD, D' positions*] range from (73% - 89%).

In question 8, despite more teachers (45%) indicating a positive perception, their responses – compared to the previous set of questions – reveal a divided population between 'SA, A' and 'SD, D' positions. This indicates that sharing control within the classroom by discussing how to better teaching and learning with students is not a common practice. A polarised pattern can also be observed in question 7 where the responses are spread out and tend to be almost equally divided between 'SA, A' and 'SD, D' positions. Thus, almost half of the teaching population cast doubt on the effectiveness of their university training.

Other issues where the majority of teachers responded negatively are evident in questions 3, 5, 9 and 11. In these questions between (49% - 61%) [*The sum total of those in 'SA, A' and/or 'SD, D' positions*] of the teacher population revealed less competence in their practices. Overall, in the majority of questions, the surveyed Egyptian teachers express competence in managing their classroom practices.

Part I Question 1 (Scottish Sample)

	In my classroom teaching...	SA	A	N	D	SD	M
1	I have a clear plan about developing the thinking of pupils.	13	55	21	12	0	0
2	I am aware of the prerequisites needed to develop the thinking of pupils.	13	58	17	10	0	3
3	I find it difficult to address the different developmental stages of pupils.	1	33	13	44	9	0
4	I feel confident in my ability to support pupils when I introduce new ideas to them.	21	63	9	4	1	3
5	I do not find it easy to model consistently how to question things.	1	17	26	46	9	1
6	I consistently encourage pupils to think of various points and answers to any issue.	23	55	13	9	0	0
7	I did not receive good enough training to help me plan my lessons in a way that addresses thinking as well as content.	18	39	24	12	8	0
8	I rarely discuss with my pupils how to make learning and teaching better.	3	22	14	46	16	0
9	I rarely invite my colleague to attend my classes and help me reflect on my practices.	15	28	13	37	7	0
10	I often give pupils the time and the chance to explain and analyse their thinking.	14	50	24	11	0	0
11	I record (e.g. video or tape) some of my classes to go through my practices gain.	4	8	13	45	30	1
12	I consistently use language in a way that encourages my pupils to think.	14	62	23	1	0	0
13	I help my pupils to understand that the ultimate goal of learning is the development of thinking.	9	45	30	13	3	1

Looking at the table of the surveyed Scottish group, similar patterns are observed. In ten out of the thirteen questions, teachers' responses indicate the same positive perceptions in managing what goes on inside their classrooms. Examples of these are issues discussed in questions number 1, 2, 3, 4, 5, 6, 8, 10, 12, and 13. In these questions, about (53% - 83%) of the teachers' population [*the sum total of those in 'SA, A' and/or 'SD, D' positions*] expressed this competence. A polarised pattern of responses is noticed in question 9 where the sum total of teachers in 'SA, A' positions is almost equal to those in 'SD, D' positions. About (57% - 75%) of the Scottish teachers [*the sum total of those in 'SA, A' and/or 'SD, D' positions*] raised concerns with issues discussed in question 7 and 11. A majority of teachers doubt the effectiveness of their teacher education training and a low percentage use tape or videotape to reflect on their practices.

Summary

Despite the differences between the Egyptian and the Scottish educational systems, teachers – in both contexts – reveal an overall similar pattern of responses. They share the same positive perceptions of their efficacies in handling many of their instructional practices in a way that support the development of their students' thinking. Teachers, in both countries, also share similar concerns. One of which is that they do not have enough chances to get engaged in activities that would promote reflection on their own practices. Furthermore, they express a lack of confidence in the effectiveness of their teacher training education in preparing them to teach for developing their students' abilities.

Part I – Question 2: Issues Related to Curriculum

Part I Question 2 (Egyptian Sample)

	The curriculum I'm given...	SA	A	N	D	SD	M
1	is designed in a way that provokes thinking.	14	26	12	39	9	0
2	is flexible enough to give the teacher and the pupils the chance to pursue what was of interest.	12	26	14	37	11	1
3	Does not encourage pupils to see different points of views.	15	33	16	29	6	1
4	Does not include various thinking activities that engage pupils in the learning process.	17	32	11	32	7	2
5	is designed around developing higher order thinking skills.	14	22	16	32	15	1
6	takes individual differences into account.	12	32	15	32	10	0
7	considers discovering more that covering.	6	21	13	40	17	2
8	Does not encourage pupils to connect and relate the different topics and different subjects.	12	27	22	31	7	2
9	includes a clear list of thinking skills the teacher should develop through teaching.	7	34	20	32	6	1

Teachers' perceptions of how the curriculum they teach helps them in addressing their students' development and thinking reveal two patterns. The first is a divided distribution where teachers' views are split between 'SA, A' and 'SD, D' positions. Questions that typically reflect this pattern are 6, 8 and 9 where the sum total of those in 'SA, A' are almost equal to those in 'SD, D' positions.

The second pattern is revealed in questions (1, 2, 3, 4, 5 and 7) where the majority of teachers [*in the sum total of teachers' percentages in 'SA, A' or 'SD, D' positions*] expressed dissatisfaction with many aspects of the structure of the current curriculum.

Overall, in the majority of questions, the teachers surveyed expressed a lack of confidence in how the mandated curriculum is structured to increase their students' abilities.

Part I Question 2 (Scottish Sample)

	The curriculum I'm given...	SA	A	N	D	SD	M
1	is designed in a way that provokes thinking.	4	26	30	30	12	0
2	is flexible enough to give the teacher and the pupils the chance to pursue what was of interest.	5	26	14	42	12	1
3	Does not encourage pupils to see different points of views.	6	21	24	41	8	0
4	Does not include various thinking activities that engage pupils in the learning process.	9	28	23	32	8	0
5	is designed around developing higher order thinking skills.	4	28	24	36	8	0
6	takes individual differences into account.	9	46	18	22	5	0
7	Considers discovering more that covering.	7	13	28	33	13	5
8	Does not encourage pupils to connect and relate the different topics and different subjects.	9	28	22	35	6	0
9	includes a clear list of thinking skills the teacher should develop through teaching.	3	12	17	53	17	0

The Scottish teachers' data also indicates a division in teachers' responses. In questions 4 and 8, the sum total of those in 'SA, A' positions is quite close to those in 'SD, D' positions.

The majority of Scottish teachers, nonetheless, seem to perceive the curriculum as being designed in a way that takes individual differences into account (question 6) as well as encouraging pupils to see different points of views (question 3).

Despite this, in the remaining five questions (1, 2, 5, 7, 9), the majority of teachers lack confidence in how the current curriculum guidelines help them to encourage students' thinking or be flexible to pursue areas of interest.

Summary

To sum up, teachers in both the Egyptian and the Scottish contexts identify more deficits than positive attributes with the mandated curriculum. Despite the differences that exist between both educational systems, teachers in both contexts recorded doubt in the effectiveness of the curriculum in addressing issues that aim at developing their students' thinking.

Part I – Question 3: Issues related to Assessment

Part I Question 3 (Egyptian Sample)

	The assessment I'm asked to use....	SA	A	N	D	SD	M
1	often focuses on memory and rarely addresses higher order thinking skills.	35	30	11	17	6	1
2	is designed to diagnose strength, development needs and next steps in learning.	8	25	24	34	7	0
3	provides sufficient evidence of the efficacy of teachers in developing the thinking of pupils.	10	26	15	35	12	2
4	gives a clear basis for judging the intellectual development of pupils.	12	25	18	37	8	1
5	is rarely a dynamic interactive part of the learning process.	14	35	14	30	5	2
6	provides an adequate and fair tool to judge the progress and success of the school in achieving its goals.	8	22	16	36	17	1

Despite division in teachers' responses between 'SA, A' and 'SD, D' positions in questions (2, 3, 4, 5), the majority of the Egyptian teachers have negative perceptions of the nature of assessment. This is indicated in their responses to all of the discussed issues above.

Part I Question 3 (Scottish Sample)

	The assessment I'm asked to use....	SA	A	N	D	SD	M
1	often focuses on memory and rarely addresses higher order thinking skills.	12	51	12	23	3	0
2	is designed to diagnose strength, development needs and next steps in learning.	8	62	9	19	3	0
3	provides sufficient evidence of the efficacy of teachers in developing the thinking of pupils.	1	9	44	42	1	3
4	gives a clear basis for judging the intellectual development of pupils.	1	24	31	39	4	1
5	is rarely a dynamic interactive part of the learning process.	9	53	14	19	4	1
6	provides an adequate and fair tool to judge the progress and success of the school in achieving its goals.	0	44	30	22	4	1

Although Scottish teachers acknowledged two positive attributes in the assessment procedures of the Scottish educational system (question 2 and 6), in the remaining set (1, 3, 4 and 5) the majority of teachers identified serious issues as to how it helps them to address and to develop students' thinking.

Summary

It can be concluded that in both contexts, the Egyptian and the Scottish, teachers are prone to have negative perceptions of assessment, its nature and objectives. However, it is to be noted that the Scottish group's perception is not as exclusively negative as that of the Egyptian group.

Part I - Question 4: Issues related to School Departments and Collegiality

Part I Question 4 (Egyptian Sample)

	My colleagues and I...	SA	A	N	D	SD	M
1	are overloaded with work that we rarely have time to talk about topics like thinking or development.	33	29	12	16	7	4
2	share the same interest in how to motivate and create engaging learning experiences for pupils.	12	47	14	20	4	4
3	consider ourselves as learners.	21	55	11	8	3	3
4	feel isolated in our classrooms and its demands.	10	28	19	29	10	4
5	employ a wide variety of activities that are centred on the concept of developing pupils' thinking.	9	39	21	22	5	3
6	are rarely engaged in discussions about how to develop the thinking of pupils.	9	35	15	32	7	3
7	are keen to make our school a community of learners.	21	40	24	10	2	4
8	encourage and support each other to experiment with new ideas in teaching.	23	43	13	14	5	3

There is an overall positive perception of teachers' departmental ethos noticed in questions 2, 3, 5, 7, and 8 where about (48%-66%) of the sum total of teachers in 'SA, A' positions revealed these positive perceptions. Polarisation of responses is noticed in question 4 where teachers' views are almost equally split between 'SA, A' and 'SD, D' positions. Despite a division in question 6, many teachers (44%) are rarely engaged with their colleagues in discussions about developing their students' thinking. The negative pattern of responses noticed in question 1 emphasises the latter view.

Part I Question 4 (Scottish Sample)

	My colleagues and I...	SA	A	N	SD	D	M
1	are overloaded with work that we rarely have time to talk about topics like thinking or development.	26	46	15	10	0	3
2	share the same interest in how to motivate and create engaging learning experiences for pupils.	5	45	27	19	3	1
3	consider ourselves as learners.	21	55	21	3	0	1
4	feel isolated in our classrooms and its demands.	5	27	22	40	5	1
5	employ a wide variety of activities that are centred on the concept of developing pupils' thinking.	4	41	28	24	1	1
6	are rarely engaged in discussions about how to develop the thinking of pupils.	12	32	22	28	5	1
7	are keen to make our school a community of learners.	24	44	26	5	0	1
8	encourage and support each other to experiment with new ideas in teaching.	13	47	13	24	1	1

Similar patterns of responses are noticed with the Scottish group. Teachers have positive perceptions of their departmental ethos (questions 2, 3, 4, 5, 7 and 8). Division in responses is noticed in questions 4 and 6. Negative perception is similarly noticed in the issue discussed in question 1.

Part I–Question 5: Issues Related to School, Local Authorities and Policy Making

Part I Question 5 (Egyptian Sample)

	The way my school is run....	SA	A	N	SD	D	M
1	encourages formal and informal discussions on how to develop pupils' thinking.	14	28	16	28	12	3
2	does not approve of the concept of 'shared control and leadership'.	14	29	17	29	8	3
3	encourages and supports the freedom of teachers to experiment with new ideas in teaching.	9	31	22	21	13	4
4	welcomes new ideas and experiments on educational reform.	18	32	17	21	10	3
5	ensures that outside pressures of direction and accountability focus on developing the potentialities of teachers.	11	38	22	18	7	4
6	rarely updates teachers with the recent research on teaching and learning.	27	29	16	20	5	3
7	Decision-makers at a national level rarely welcome suggestions from teachers about educational reform.	29	27	15	17	10	3
8	Supervisors' discussions focus on developing the thinking of pupils.	13	30	21	20	12	4

A division of views is noticed in questions 1, 2, 3 and 8 where the views of teachers are almost evenly split between 'SA, A' and 'SD, D' positions. Despite this division, the largest percentage of teachers in questions 1, 3 and 8 have positive perception of their schools ethos. In questions 4 and 5, an even higher percentage of the teacher population (respectively 50%, 49%) in 'SA, A' positions seem to share these positive perceptions.

Nonetheless, more than half of the teachers' population have concerns as to the issues discussed in questions 6 and 7.

It is also to be noted that in comparison with other categories, in five of the eight questions, the second highest percentage of the Egyptian teachers majority are in the 'N' position.

Part I Question 5 (Scottish Sample)

	The way my school is run....	SA	A	N	SD	D	M
1	encourages formal and informal discussions on how to develop pupils' thinking.	6	32	27	30	5	3
2	Does not approve of the concept of 'shared control and leadership'.	8	15	26	41	8	3
3	encourages and supports the freedom of teachers to experiment with new ideas in teaching.	8	54	14	18	4	3
4	welcomes new ideas and experiments on educational reform.	8	46	30	13	3	1
5	ensures that outside pressures of direction and accountability focus on developing the potentialities of teachers.	5	23	42	24	4	1
6	rarely updates teachers with the recent research on teaching and learning.	8	19	18	41	13	1
7	Decision-makers at a national level rarely welcome suggestions from teachers about educational reform.	13	40	30	17	0	1
8	Supervisors' discussions focus on developing the thinking of pupils.	3	21	35	33	5	4

Scottish teachers responses are generally positive. Typical examples of this are in questions 1, 2, 3, 4 and 6. However, teachers' responses to the issue discussed in question 1 reveal polarisation as the views are split between 'SA, A' and 'SD, D' positions.

In discussing issues related to supervision and external pressures as in questions 5 and 8, the majority of teachers chose to go for the 'N' position. However, in question 8, the percentage of teachers who held negative perception ('SD, D' positions) towards the role supervision plays in helping teachers developing students' thinking is higher than those who chose 'SA, A' positions. Concerns are also raised in teachers' perceptions of the extent to which policy makers take teachers' suggestions into account when it comes to educational reform issues (question 7).

Summary

Generally speaking, teachers in the Scottish context tend to be more positive in their perceptions of the role their schools play in empowering them to teach for thinking than do teachers in the Egyptian context. However, this positive view is not mirrored when it comes to authorities outside schools. The majority of teachers in both contexts share the view that – on national levels – their voices are not taken into account when educational reform is considered.

Part II – Questions 1, 2 and 3

In this section, data from all part II questions 1, 2, 3, 4 and 5 are presented. The data obtained are then collectively summarised before being discussed in the next section.

Part II – Question 1

	The THREE largest obstacles teachers perceive they would face if they are keen to introduce new developments in their schools	Egyptian Teachers		Scottish Teachers	
		Order	%	Order	%
1	Motivating colleagues	9	11%	**3**	**31%**
2	Motivating pupils	**2**	**42%**	9	12%
3	The need to cover the syllabus in the allocated time	4	38%	**2**	**55%**
4	Exams requirements	6	21%	6	21%
5	The need for more training	8	17%	7	18%
6	Freedom to experiment	7	19%	8	13%
7	Time	5	35%	**1**	**85%**
8	Class size	**1**	**60%**	4	30%
9	Resources and equipment	**3**	**39%**	5	26%

Part II – Question 2

	TWO most influential people who teachers perceive as having the greatest control over educational change	Egyptian Teachers		Scottish Teachers	
		Order	%	Order	%
1	Teachers	3	51%	6	23%
2	Local authority staff	8	1%	**2**	**37%**
3	The minister of education	4	45%	**1**	**44%**
4	Head teachers	5	11%	4	26%
5	Curriculum designers	**2**	**62%**	3	30%
6	Pupils	**1**	**83%**	8	4%
7	Supervisors	7	7%	5	26%
8	MEPs or MSPs	6	8%	7	17%

Part II – Question 3

	TWO areas that are in most need of reform in the educational system	Egyptian Teachers		Scottish Teachers	
		Order	%	Order	%
1	Curriculum	**2**	**34%**	**1**	**64%**
2	Assessment	**1**	**52%**	**2**	**40%**
3	Schools staff attitudes	6	11%	8	0%
4	Teaching methodology	4	22%	5	23%
5	Teacher training	5	16%	4	26%
6	Teacher attitudes	7	7%	3	36%
7	School organization	3	27%	6	17%

Part II – Question 4

How hopeful are you of achieving educational reform?	Egyptian Teachers	Scottish Teachers
	%	%
Much	20	18
Very Slightly	63	64
Not at all	17	17

Part II – Question 5

To what extent do you think you have fulfilled your latent potential as a teacher?	Egyptian Teachers	Scottish Teachers
	%	%
Much	12	63
Very Slightly	70	32
Not at all	18	3

Summary of Part II Questions

In this set of questions, Egyptian and Scottish teachers were asked to prioritise what they perceived as

- the three largest obstacles they anticipated they would face when they are keen to introduce new developments in their schools (Question 1).
- the two most influential people who have the greatest control over educational change (Question 2).
- the two areas in most need of educational reform (Question 3).

While the surveyed Egyptian teachers group identified the issues of class size, motivating pupils and resources and equipment as the three largest obstacles they may face in implementing new innovations, their Scottish counterparts raised different concerns related to time, covering the syllabus in the allocated time and motivating their colleagues.

In considering those who are most influential in implementing change, the Scottish group's responses have revealed a perception of a top-down centralised approach to education. Interestingly, the majority of the Egyptian teachers identified a bottom-up decentralised approach to educational change where the 'students' were held top on their list.

Most interestingly, the Egyptian and the Scottish teachers' groups have both identified assessment and curriculum as the two areas in most need for reform in the educational system.

It is worth noting that in the above three questions, spaces were provided in the list of choices for respondents to add or specify something or someone else as a choice of their own. They, however, were never used.

Despite differences between the educational systems of both contexts, results revealed similar pattern of responses where the majority of the Egyptian and the Scottish teachers lack belief and confidence that educational change is achievable (question 4). More elaborations on the reasons behind teachers' perceptions are discussed in the next section. As to their feelings of professional flourish and fulfilment, the Scottish teachers are much more positive than their Egyptian counterparts (question 5).

12.8 Discussion

The cross-cultural investigation of the generalisability and the applicability of the themes raised by the interviewed Egyptian teachers, in chapter eleven, uncovered interesting patterns of responses. Not only did the results presented above provide more understanding of teachers' perceptions about educational change in general, but they also helped identifying what teachers perceived to be the most strategic leverage points of achieving educational change.

Results of the questionnaire's parts of both the Egyptian and the Scottish contexts will be discussed. Where applicable, Egyptian teachers' results on this questionnaire will be related to their interview accounts (Chapter Eleven).

Part I – Questions (1, 2, 3, 4, 5) and Part II –Question (3)

Despite the differences between the educational systems, the results from the Egyptian and the Scottish teachers' groups revealed a general pattern of consistency in teachers' responses. Not only did teachers in both contexts reveal similar patterns of positive perceptions but also raised similar issues to be of concern. These patterns are discussed in the following two sections. The first discusses in detail the categories where teachers predominantly revealed a degree of confidence and positive perception. The second deals with the categories where teachers predominantly revealed aspects of concern.

Aspects of Confidence and Positive Perception

Both the Egyptian and the Scottish teachers revealed an overall positive perception of many issues related to their classroom practices, their school departments and collegiality ethos and their school, local authority and policy making.

Issues Related to Classroom Practices

Teachers in the Egyptian and the Scottish contexts seem to be aware of the prerequisites necessary to facilitate teaching for thinking and development and are consciously planning their actions and practices accordingly. Moreover, teachers in both contexts identified similar concerns about issues related to educational systems and the school day structure.

Teachers seem to be too overwhelmed with the demands of their job to have enough time to purposefully engage in activities that promote reflection on their practices. Talking about the American context, Caine and Caine (1997c) sum it up saying that teachers have "little time between classes, plus little time dedicated to teacher reflection, to genuine teacher dialogue. So time, or lack of it, as teachers and students move from one class to the next, inhibits complex learning and change" (p. 99). Teachers in both contexts also expressed doubts about how well their initial teacher education courses prepared them for teaching for understanding to develop their students thinking abilities. This perception seems to echo with research findings discussed earlier (Chapter Three) confirming the need to rethink such courses.

During the interviews (Chapter Eleven), the Egyptian teachers expressed dissatisfaction with their lack of subject and pedagogical knowledge. They also criticised what they perceived to be poor pre-service and in-service training opportunities. This is confirmed yet again in their responses to the current questionnaire where the majority think that they did not receive good enough pre-service training [Part I – Question 1 – Item 7] and that schools are not keeping them updated with the recent research about teaching and learning [Part I – Question 5 – Item 6]. It is, therefore, puzzling to see them in the current investigation expressing such confidence despite the conditions they previously displayed.

Issues related to School Departments and Collegiality

Patterns of confidence and positive perceptions were also observed in the Egyptian and Scottish teachers' perceptions of the departments within their schools. This is promising since many studies have consistently shown that the process of change within many schools occur within the departments (Anderson, 1995; Anderson, 1996; Anderson & Helms, 2001). Though much of the 'change' research focuses on whole-school change, Talbert (1994) and Sachs (2003) point to the power of the departments in forging a professional community and a community of practice*. She suggests that teachers' professional lives form within "multiple embedded contexts", with the department as primary. The socialisation effect of departments in forming teachers' professional identity was noticed from the Egyptian teachers' interviews account (Chapter Eleven). Nonetheless, results from this survey reveal a picture that is much more positive than that exhibited previously by the interviewed Egyptian teachers.

While this and other research (Grossman & Stodolsky, 1995; Little, 1993; McLaughlin, 1993) point to the departments as an important context for teacher development, there are issues related to other barriers that impede creating effective departmental ethos. The Egyptian and the Scottish teachers groups identified two of such issues: finding the time within the overwhelming and overloading demands of their job and how to make best use

* A term used by Etienne Wenger (1998) to refer to the process of social learning that occurs when people who have a common interest in some subject or problem collaborate and negotiate to share ideas, find solutions and build innovations.

of this time in order to engage in reflective discussion about how to develop their students' abilities.

Issues Related to School, Local Authorities and Policy Making

Research on change has identified school context that is based on collaboration and a shared vision about what and how to change as one of the 'core capacities' needed for substantive and lasting change (Anderson & Helms, 2001; Fullan, 1993). Teachers' school environments that encourage collaboration towards similar goals represent the most effective path to change. While this means that all teachers most certainly are not moulded to hold the same or even similar philosophies, they, nonetheless, are found to exhibit what Anderson & Helms (2001) quote as "consciousness" which can provide an important starting place in collaborative reflection for real change.

Positive perceptions of school ethos were identified in the Scottish teachers' group. Though also evident in the Egyptian sample, it was not as strong as their Scottish counterparts. The Egyptian teachers seem to be specifically concerned about the lack of being updated with the research on teaching and learning and in-service training: a concern not shared with the majority of the Scottish group. Both the Egyptian and Scottish teachers, nonetheless, revealed agreement that their voices of change are trapped within their schools and do not reach beyond that to echo on the national level of decision making.

The perspective of the Egyptian group on the latter issue is in alignment with the accounts of those interviewed earlier in chapter eleven. Nonetheless, the divided pattern of views – most dominant in their views about their school ethos – suggests a variance in opinion that makes it difficult to reach a conclusive judgment. This variance may be due to the differences in the ethos among the surveyed schools. It may also be explained by the fact that in many schools, teachers were informed that the filled questionnaires would ultimately be handed to the school head teacher or principal. This not only might have coloured teachers' responses but also might explain the tendency for the second highest percentage of teachers going for the 'N' position, which is particularly noticed in this category compared to the rest.

A Summary

Despite the positive perceptions noticed in teachers' responses to the majority of questions in the above three categories, teachers – of both contexts – raised shared concerns as to the issue of time and being overwhelmed with their classroom demands. There is not enough time for teachers to get engaged in reflective activities about their teaching practices or in reflective dialogues with their colleagues. Moreover, feeling of disempowerment is noticed as they feel their voices are not accounted for in the process of making decisions about education reform. There is a sense of teachers being perceived as technicians – not as professionals – who have to act to the prescribed expectations without having the time to think about them.

Aspects of Concern

In the three discussed categories above, the Egyptian and the Scottish teachers' positive responses outnumbered those which raised concerns. This pattern was, however, reversed in the categories that dealt with teachers' perceptions of curriculum and assessment discussed next.

Issues Related to Curriculum and Assessment

The responses of the Egyptian and the Scottish teachers have revealed the majority of teachers in both contexts are dissatisfied with many aspects of the current curricular and assessment procedures. The perception of the Egyptian teachers specifically portrayed a dim picture of assessment. These findings are validated and confirmed in teachers' responses to what they perceive to be the two areas in most need of educational reform (Part II – Question 3). Both the Egyptian and the Scottish teachers have prioritised curriculum and assessment above all other options.

Other studies, for example, those of Yerrick, Parke, & Nugent (1997) and Haney & McArthur (2002), conducted respectively with teachers and prospective teachers show consistency with the current findings. Through evaluating the effect of a two-week staff development intervention course and the effect of a teacher training course respectively, both studies aimed (through case studies) to investigate teachers' beliefs and the interpretation of such beliefs into classroom teaching practices. Consistently, findings have revealed that participants maintain their entry traditional beliefs about knowledge, teaching and learning. Researchers (Hollon & Anderson, 1987; Yerrick et al., 1997) found that, teachers employ an intricate set of resolving and rationalising mechanisms to allow them to assimilate potentially contrary messages in ways that accentuate their own beliefs and do not change their fundamental views of learning and teaching. The researchers claim that to achieve a deeply rooted change, other contextual barriers need to be identified to provide the support necessary for teachers to interpret and rethink their practices. From interviewing teachers, Yerrick et al.(1997) concluded that "there are major forces which influence and often mandate how teachers in our study will teach. School policies, pre-service training, strict accountability, rigorous state assessment, teacher socialisation, and rural community conservative expectations are among them. We conjecture that participants in our study are so clearly convinced or so wholly bought into the notion of mandated curriculum and assessment that they resist thinking about content and teaching in any other way" (p. 154).

Similarly, Haney & McArthur (2002) have found that the "belief in the need to adhere to the existing local science curriculum was an evident obstacle" (p. 798) for all the involved participants to implement constructivist teaching practices. They also concluded that it will be extremely difficult and unlikely for teachers to align their beliefs to their practices "unless testing policies reflect both what students need to know as well as how they come

to know it. Only then will constructivist practices in the classroom be both prevalent and impactful" (p. 801).

Both studies put emphasis on curriculum and assessment as the two dominant themes that impede teachers either from departing their original beliefs or from interpreting what they believe in into action. These findings are consistent with the perceptions of the Egyptian and the Scottish teachers surveyed in the current investigation. It can be argued that both curriculum and assessment were criticised (I-2, I-3) and singled out (II-3) because these are the two major frames within which teachers' daily job is defined. This could also be because they are so closely tied with the rewards and penalties of their jobs. From teachers' perspectives, then, it is understandable that what needs real change – more than their beliefs, attitudes or anything else – are the current procedures of assessment and curriculum.

Assessment and Curriculum as Levers of Change: A Critique

From interviewing Egyptian teachers (Chapter Eleven), it was clear that new forms of assessment and improved curriculum were thought of as the major leverage point for fostering better instruction. Controlling assessment is, in its essence, a control of the curriculum and how it is taught. Curriculum and assessment reform, therefore, is based on the premise that, because teachers tend to modify the format of their instruction to fit a high-profile test, reform strategies should change the content and format of such tests. This, in turn, will lead to teachers being able to concentrate more on coverage of important learning outcomes and mirroring good instruction.

Such a view was evident in the majority of teachers' perspectives as a policy adopted by decision makers. Nevertheless, findings from the current investigation seem also to suggest that not only was it an educational change policy, but that the majority of teachers also bought into the assumption that both improved forms of assessments and improved curriculum are the major impetus that drives reform.

The view that assessment is the catalyst of reform have also proved popular among researchers (Evans & Honour, 1997; Hatab, 1996; Knapper & Cropley, 1985; Simmons & Resnick, 1993). Examining the work of Marton and Saljo (1976) in the Egyptian context, Al Kafas (2004) have investigated the extent to which prospective postgraduate teachers change their learning strategies to answer carefully designed sets of questions. Results from this empirical investigation showed consistency with the findings of Marton and Saljo's study (1976) where significant changes in how students approached learning depended on the types and format of the assessment process. These findings suggest that assessment plays a key role in guiding and directing students' and teachers' learning and, perhaps, teaching strategies. Nonetheless, understanding about students' changing their learning strategies to meet exams expectations has not been matched by equivalent empirical understanding about teachers and their teaching approaches.

Despite this evident effect in causing change, this approach seems to reflect a mechanistic behaviourist view of teaching, learning and change. In its essence, it embraces the concept of 'teaching for the test'. It is also based on the viewpoint of forcing teachers to change without giving them a chance to endorse and vision this change. The change it aims to achieve is, therefore, behavioural and technical not philosophical, epistemological or structural one depicting teachers, yet again, as reactive and receiving technicians.

The Educational System Revisited

As a result of the findings from the questionnaire it is now possible to revisit the model of the educational system presented earlier in (figure 11.4). As teachers thought of assessment and curriculum to be the strategic points of educational reform, they are to be considered the important points where the cycle – discussed previously of past experiences, beliefs, training, practices and the educational system – is to be broken. Hence, they are to be placed at the centre of the educational system and its dynamics (figure 12.1).

Figure 12.1: An Interconnected, Dynamic, Complex Open Model for the Educational System Revisited

Findings from the current investigation have revealed a great degree of dissatisfaction from the majority of the Egyptian and the Scottish teachers about the current curricular and assessment procedures. Dissatisfaction – as been discussed earlier in chapter eleven – is the initial stage of 'disequilibrium' that would lead the change spiral (Figure 11.3). For teachers to move along the remaining stages, they need to feel the need of change, embrace it and create a vision of it. In such a way, change will be an intrinsic – not externally

imposed – part of their professional and human being. If so, it would be more resilient, deeply rooted and ingrained way of perceiving life and living it.

In such a vision, students' needs and interests should be central to what the curriculum is about. Students have to perceive that what they are taught is relevant, important and of use. It is the teachers' role to create the interest and the motivation. Curriculum has to focus not only on 'what' but also 'how' to accommodate individual students who construct knowledge and understanding in a very personal and unique way. Any assessment process should endorse these objectives.

Assessment in a social constructivist paradigm should become a learning experience for both students and teachers where "instead of giving the children a task and measure how well they do or how badly they fail, one can give the children the task and observe how much and what kind of help they need in order complete the task successfully. In this approach the child is not assessed alone. Rather, the social system of the teacher and child is dynamically assessed to determine how far along it has progressed" (Newman, Griffin, & Cole, 1989, p. 87).

Thinking of curriculum and assessment from this perspective requires critical rethinking of the current educational standards and accountability models, rethinking the nature of curriculum and assessment and their role in supporting educational reform and requires an open discussion that should involve a wider population than the few decision making political elite.

Part II – Questions (1, 2)

In identifying other obstacles teachers perceive to impede them from introducing new innovations in their schools, differences between Egyptian and Scottish teachers' concerns have been revealed (Part II – Question 1). Whereas the Scottish group was concerned about time, the need to cover the syllabus in the allocated time (confirming the results of Part I) and motivating their colleagues, the Egyptian group identified problems with class size, motivating pupils and resources and equipment. These particular concerns might be a reflection on the peculiar nature of each society and its educational systems.

In (Part II – Question 2), teachers were asked to name those who they believe have greatest control over educational change. The Scottish teachers' group have revealed a top-down centralised approach that is consistent with those of the interviewed Egyptian group (Chapter Eleven) indicating a sense of disempowerment validating their responses on (Part I – Question 5 – Item 7). Interestingly, in the current investigation, the surveyed Egyptian group has shown a diverse pattern where the majority of teachers selected students as the most influential personnel in control of educational reform. In essence, this may be a reflection to the hierarchical nature of the educational system portrayed earlier in (Chapter Eleven) where it is easier to blame those who are beneath than to criticise oneself or those above in the hierarchy. Curriculum designers were as well believed to be of great influence on educational change. This issue was also raised in the previous interviews.

A Summary

Generally speaking, it can be argued that from teachers' responses to the previous questions, Egyptian teachers seem to reveal a bottom-up 'child deficit' approach to their educational perceptions where they held students, their motivation and their numbers as inhibitors. Scottish teachers' held, nonetheless, a 'teacher deficit' approach as they are more concerned with motivating colleagues and have a top down approach to educational reform.

Part II Questions (4, 5)

Fullan (1993) states that "Systems don't change when people wait for someone else to correct the problem" (p. 104). For a recipe of positive change that ultimately leads to human flourishing, there seem to be essential qualities and ingredients. Fredrickson (2006) states that positive characters, cognitions, and relationships are each, in themselves, central mechanisms that seed human flourishing. In addition, she claims that positive emotions (e.g. of optimism, commitment, interest, etc) if construed in appropriate breadth and depth, may turn out to be "the most bedrock of these enablers and mechanisms of human flourishing" (p. 57). A recent well-grounded empirical work has revealed that positive emotions predict the quality of life e.g., Diener, Suh, Lucas, & Smith, (1999) Harker & Keltner, (2001). So if the most central mission behind educational reform is to understand and promote human flourishing, it was of interest to get a glimpse of how positive and hopeful teachers are of educational reform (Part II – Question 4). Interestingly, when asked about how hopeful are they of the educational reform being achievable, the responses of the Egyptian and Scottish teachers revealed the same pattern of responses. What might be not that 'optimistic' is the fact that two third of the surveyed teachers of both populations have slight belief in educational reform being achievable.

Fredrickson & Losada (2005) state that people who flourish live within an optimal range of human functioning, one that simultaneously connotes goodness, generativity, growth, and resilience. These are the kind of qualities teachers, educators, reformers and all engaged within the system should aim at endorsing. Yet, if educational change should ultimately result in fulfilling students' potentialities, an issue of great interest is then raised. Phrased in the words of the 'Perry C' teacher previously in (Chapter Eleven) and those of Deci, Schwartz, Sheinman, & Ryan (1981), it is about the extent to which teachers feel that their latent potentialities are fulfilled (Part II – Question 5) as it takes a teacher with fulfilled potentialities to fulfil their students' ones. Teachers' responses revealed the majority of the Scottish group in a more positive situation that the majority of the Egyptian group. Perhaps, a cross-cultural review of how teachers are supported in the Scottish context might offer guidance for the educational policy in Egypt.

It's worth noting that, in commenting on how they perceive the possibility of real educational reform, teachers in the Scottish context have, interestingly, raised issues that seem consistent with the themes previously identified in the Egyptian teachers' interviews.

Almost 44% of Scottish teachers' comments were direct criticism of the system. Typical comments of their views that explain why they are slightly confident in achieving reform are *"the politicisation of education... often top down...teachers' views not considered at outset"*, *"distance of policy makers from 'real' teaching experiences"*, *"I think there has to be a radical change in the system (not sure what this would be) but there has to be more 'doing rather than talking'"*, *"education is a tool of politicians. Teachers have little autonomy"*, *"there is little evidence of what works and why"*, *"the rigidity of the system"* and *"there is a lack of teachers' input into issues"*. Other teachers seemed more optimistic recognising the efforts of the Scottish executive. Here are sample of their views *"We have strong leadership which has a clear vision but also is ready to listen to staff as well as challenging their thinking"* and *"Peacock review & McCrone review value teachers... emphasising professionalism...also considering teachers as leaders hopefully will improve things"*

Scottish teachers also commented on issues related to assessment and curriculum *"the quantifiable methods of testing if education is to be effective and an inflexible curriculum"*, *"the emphasis on testing is a setback"*, *"too much reliance on testing that proves nothing and distract from breadth in education"*, *"I know what works with my children yet I am forced into curriculum... paper work taking away time from teaching"*, and *"unwillingness to tackle curriculum overload in primary school"*, and *"In secondary school the curriculum is still based on old style subjects and new teachers still come out with old subjects"*.

They also talked of various issues like the attitudes of teachers described as being *"negative"* and their *"inertia* [which] *hold back reform* [as teachers] *are reluctant to embrace new ways of teaching, to move along"*; of students' attitudes *"pupils' acceptance"*; and of the society's attitude *"change in society's attitude will prompt politicians encourage and demand reform e.g. citizenship, sex education ...etc."*. Teachers also raised the issues of *"lack of training"* which result in *"teachers feelings of inadequacy to implement changes or deliver a curriculum that they don't necessarily have skills for"*; of *"resources"*; of *"time"*; *and* of *"staffing allocation"*, but most importantly they – more than once – talked about the *"fear of change"* and the *"lack of enthusiasm and willingness to change established practices even if they know it is wrong"* to be the greatest obstacle.

The comments of the Egyptian surveyed sample echoed those of the Scottish group depicting the same themes mentioned with the interviewed sample in (Chapter Eleven) strongly validating the findings reached so far. It can be concluded, then, that these issues are of critical importance to consider in thinking about reform. The differences between each context might be issues of the scales of these issues but certainly not of their existence.

12.9 Conclusion

By cross-culturally examining the generalisability and applicability of the contextual barriers to belief change (identified earlier in Chapter Eleven), teachers of both contexts identified similar areas of confidence and concern.

Whereas teachers of the Egyptian and the Scottish contexts positively perceived the majority of issues related to their capabilities to manage their classroom teaching, their departmental ethos, and their school ethos, they considered time constraints and work overload as great inhibitors. They also identified the systems' current curriculum and assessment procedures to be of particular importance. Not only did they express dissatisfaction with their current nature and objectives, but also they singled them out to be the areas in most need of change.

The Egyptian and the Scottish teachers' responses as to why they are less hopeful of educational change being achievable echoes the themes deduced earlier from the interviews (chapter 10). They also provided a validation to the previous analysis as well as emphasised yet again the importance and interconnectedness of all these themes. In light of these findings the model previously presented (chapter 10) about an alternative vision of the educational system was revisited.

These findings highlight issues that are of critical and significant importance to the success of any proposed educational plans of reform. Serious consideration of these issues is key to initiate and provide support for teachers to think, interpret and rethink their beliefs and practices.

Chapter Thirteen

Summary, Major Findings and Recommendations

13.1 Introduction

The primary purpose of this research project was to investigate the development of pre- and in-service teachers' educational beliefs. In addition, the factors and influences that in-service teachers perceived to affect their belief profiles along with the strategic leverage points for achieving educational change were identified. The cultural settings of this investigation were the Egyptian and the Scottish educational contexts.

The specific aims this study embarked on investigating were to:

1. find out if and how student teachers' educational beliefs change over their four years degree.
2. ascertain how the educational beliefs of undergraduate student teachers compare with those of postgraduate student teachers.
3. compare the educational beliefs held by student teachers with practicing teachers.
4. investigate if the overall pattern of belief change is universally generalisable across both cultures: the Egyptian and the Scottish – as has been hypothesised by Perry in his model.
5. explore the factors Egyptian and Scottish teachers perceive to be responsible for any change in their belief profiles.
6. explore what teachers perceive to be the most strategic leverage points for educational change.
7. get a cross-cultural insight into teachers' perceptions of issues related to the possibility of achieving educational reform.

Investigating these aims involved the juxtaposed use of both quantitative and qualitative approaches to get better insights into respondents' implicit theories and mental world.

13.2 Major Findings

In this section, major findings emerging from this study's quantitative and qualitative investigations are identified. The presentation of these findings will be organised in terms of five themes which subsume some of the aims presented earlier. These themed major findings are:

- *Beliefs do change: They regress and develop* discussing findings from investigating Aim 1, 2, 3 and 4.

- *Factors affecting belief change* discussing findings from investigating Aim 5.
- *Beliefs affect teachers' teaching approaches and practices* discussing findings from investigating Aim 5.
- *Levers of change* discussing findings from investigating Aim 6 and 7.
- *Bringing it together: Ways of breaking the cycle of 'Perry A' beliefs* discussing findings noticed throughout the investigation of these aims collectively.

13.2.1 Beliefs Do Change: They Regress and Develop

Research on teachers' beliefs in relation to learning and teaching has emphasised the importance of beliefs as they represent teachers' implicit theories and personal knowledge. They serve as cognitive maps and mediators for experiencing and responding to the environment. Beliefs are thought of as taken-for-granted, tacit, unconsciously and unquestionably held. They tend to self-perpetuate and even persevere against contradiction caused by reason, time, schooling or experience. Moreover, because beliefs are formed early in life, belief change during adulthood is considered as a relatively rare phenomenon (Pajares, 1992). Quite often individuals tend to hold on to beliefs based on incorrect or incomplete knowledge even after scientifically correct explanations are presented to them (Nespor, 1987; Pajares, 1992).

Perry (1970), nonetheless, proposed a different perspective as he mapped structural cognitive and ethical changes in college students' epistemological beliefs as to how they understood the world and made sense of their university experiences. The model, deduced from students' university experiences in what can be called an 'ideal liberal learning environments', proposed a linear, progressive pattern of development. In this model, students move from a categorical view of knowledge to the positions that are more complex and sophisticated. In essence, the model describes a shift from an objectivist to the constructivist view of knowledge. The current study is based on Johnstone's adaptation (1998) of Perry's original model.

AIM ONE

The current study traced the pattern of change in student teachers' belief profiles in both the Egyptian and the Scottish undergraduate groups. Results revealed that, throughout their university degree, in both contexts, students' beliefs did, indeed, change. This confirmed Perry's assumption that structural changes can take place at this stage of life. However, the change identified did not necessarily match the pattern identified by Perry in his model. The overall general patterns of change deduced from the data analysis of both the Egyptian and the Scottish undergraduates indicated more similarities with each other than with Perry's anticipated pattern.

Findings from the Egyptian and the Scottish undergraduates' data revealed a reversed pattern of development to that anticipated by Perry. Undergraduate students, in both contexts, started their degree with the majority in 'Perry C' relativistic thinking position. Although the majority of students, in both cultures, also completed their degree with 'Perry C' thinking positions, in many of the discussed issues, the percentage of 'Perry C' students in their final year were significantly fewer than those in the first year. As has been explored through their responses, students throughout the years either developed, retreat to 'Perry B' and/or 'Perry A' thinking or finished their degree holding the same beliefs with which they started. Findings also revealed that throughout their journey in university years, students' change did not take a clear-cut, consistent, linear path from 'Perry A' to 'Perry B' ending with 'Perry C' thinking: fluctuation and various patterns of development were noticed across all questionnaire's dimensions either of 'development', 'reversion' or of 'no significant change'.

Follow-up investigations with the Egyptian and the Scottish undergraduate students revealed that the anomalies that exist, between the patterns of development this study showed and that anticipated by Perry, may be a reflection of students' '*aspiration* vs. *reality*' complex, of '*how they expect things to be*' and '*how things turned out to be*'. First year students' responses were found to be optimistic expectations reflecting a rhetorical aspiration of how they think university learning environment should be. Their 'Perry C' congruent responses might also be what Shipman (1967a) called 'impression management' as students respond in a way they think would be desirable and favoured by their lecturers.

Final year students' responses seemed to reflect their realisation that the reality of university courses was different from what they had anticipated. This was particularly true in year four Egyptian undergraduates' accounts where students expressed great disappointment with their 'Perry A' objectivist learning environment. Other researchers (Al-Shibli, 2003; Selepeng, 2000; Zhang, 2004b) – whose studies revealed findings with final year undergraduates similar to those revealed here – have proposed various explanations that might be true to year four students' in the current study. One interpretation related students' pattern of responses to the nature of the learning environment that deprive students of the opportunities for making their own choices about their learning (Zhang, 1999). Another interpretation considered this pattern of responses as a reflection of students' anxiety and fear of their future after graduation as they are on the edge of moving to a new phase of their lives (Al-Shibli, 2003; Selepeng, 2000).

AIM TWO

Similar patterns of responses were also noticed between the Egyptian and the Scottish postgraduate groups. The belief profile of postgraduates, from both contexts, revealed that different routes into teaching did not seem to result in a significantly different belief profile. This raises an issue of great importance as to what role teacher education programs play in preparing prospective teachers, if the academic profile as well as the attitudinal and belief profile of graduates of other faculties are, at the least, quite similar. The importance

of this issue is particularly amplified as findings of the Egyptian sample have revealed postgraduates have a strong degree of confidence as they markedly went for the extreme positions of (C6) or (C5) in most of the cases. This exact point was also confirmed in the accounts of some of the interviewed Egyptian teachers in chapter eleven.

AIM THREE

Comparing the Egyptian and the Scottish teachers' beliefs to other groups of undergraduates – in their first and final year – and postgraduates of each context, two different patterns of responses were revealed. While Scottish teachers significantly formed the highest 'Perry C' thinking in the majority of the questionnaire's issues, the Egyptian teachers' beliefs pattern was quite the reverse. Despite that – on many issues – the majority of the Egyptian teachers held 'Perry C' positions, they consistently formed the smallest percentage of 'Perry C' thinkers compared to the Egyptian undergraduate groups in their first and final year of the degree and the postgraduate group. In the majority of the questionnaire's issues, they significantly reverted back to 'Perry A' and 'Perry B' thinking forming the highest percentage on both positions of all Egyptian groups.

The unfolded inconsistency between the developmental pattern of the Egyptian teachers and the pattern observed by the Scottish teachers group and that suggested by Perry formed the impetus for another investigation. The aim of this investigation was to understand the underpinning reasons behind this obvious and significant regression, findings of which are presented later on.

AIM FOUR

Not only did Perry in his model challenge the conceptions held about belief change, but also he proposed the concept of universal and transcultural sequence of change. The analysis stemming from the triadic comparisons of the undergraduate, postgraduate and teachers groups of the Egyptian and the Scottish cultural context did not support the latter hypothesis; thus casting doubt on the transcultural generalisability and universality of the scheme. The variations noticed in the developmental patterns observed in the cultural contexts of this study and that anticipated by Perry was thought of as related to the interaction between both the individual and the environment within which development take place. Theoretical and empirical investigations (Marrs, 2005; Tasaki, 2001) seemed to support the view that culture and acculturation have great effect on individuals' beliefs.

13.2.2 Factors Affecting Belief Change

AIM FIVE

From the interview with the Egyptian teachers, a number of issues were identified that teachers perceived to affect their educational practices. All teachers – from Perry's three thinking positions – identified constraints that were grouped in seven themes. These are constraints related to the classroom environment (e.g. time, curriculum, assessment,

students' motivation, students' numbers as well as issues related to classroom discipline and management), departmental ethos, school ethos, influence of local authorities and policy-making. Moreover, the Egyptian teachers' accounts included perceived constraints related to their previous school experiences, teacher education training and their ability to reflect on their own teaching.

Further validation of these generated themes was gained from Egyptian and Scottish teachers' responses to an open-ended question (Part II – Question 4) in a follow up survey.

One of the central findings of this phase of investigation was that Egyptian teachers identified that the Egyptian educational system's nature, structure, and objectives were deeply engrained in the objectivist epistemology. In this respect, 'Perry A' thinking seemed to be the most convenient type of thinking nurtured and supported by the system. Such a system is perceived to institutionalise a way of thinking that is based on the dominating hierarchical power of positions. Being positioned at the bottom of such a hierarchy, teachers, as well as students were greatly disempowered, controlled and contained (Figure 11.2).

Teachers' perceived policy makers, at the top of the educational hierarchy, as largely responsible for defining the scope of teachers' capacity to decide and act. What goes on in the classroom was predetermined and teachers were expected to follow the prescribed mandated scripts of what students should learn, how they should be taught and when, how they are to be assessed, on what and when. The consequences of these scripts focusing on the outcome of learning – rather than the process of learning – influenced the ethos, agendas and roles of local authorities, schools and its departments. These scripts seemed to emphasise the images teachers had throughout their school experiences and teacher education programs: strengthening, in this respect, the cycle of 'Perry A' beliefs.

13.2.3 Beliefs Affect Teachers' Teaching Approaches and Practices

AIM FIVE

Despite the overpowering effect of the top-down centralised approach of implementing educational policies that reinforced the dominance of 'Perry A' thinking in the Egyptian setting, the interaction between teachers' underpinning beliefs and the system has revealed different degrees of commitment to the system.

On one hand, 'Perry A' teachers expressed a state of dependence and compliance on the system. Not only did 'Perry A' teachers rely on others' authority to set the parameters of how to teach and make learning happen, but they also derived most of their power from this hierarchical system exercising their authority, in return, over students. 'Perry A' teachers' accounts rarely questioned the system, the power inherent in it, its structure, and how it contributes to the purpose of schooling. Despite being critical of specific aspects of it, the majority of 'Perry A' teachers deferred to the system. They exerted much of their mental energy not to think openly, creatively, or reflectively but to try and cope with what

is expected of them and to be wary and concerned of the consequences of not fulfilling the objectives they meant to achieve. 'Perry A' teachers were quite content with the status quo that criticising the system was only related to the introduction of any new changes. Consequently, their practices were focused on covering the prescribed curriculum teaching linearly, using behavioural objectives for students, teaching for the test and limiting their resources to what is included in teachers' guidebooks.

'Perry C' teachers, on the other hand, revealed a lesser degree of reliance on the system. They had a belief in their own self-agency that provided them with self-autonomy. They seemed to rely more on their own judgements, as they believed that they are in charge not to personalise 'the controlling authority' but because of their sense of 'self efficacy'. Despite their frustrations with the system and its structure, 'Perry C' teachers had a different perception of the system's constraints. Instead of being inhibited from fulfilling their own moral commitments and beliefs, they perceived these constraints as motivators to introduce new ideas, methods, and approaches, with or without the support of the system.

'Perry C' teachers were critical of the system and the value of its new innovations. They were also creative in finding ways to work both within and around the system trying to make use of what it offers to achieve their goals. For instance, within the parameters of the mandated curriculum, they were keen to emphasise the relevance of what is taught with real life outside schools. Moreover, despite the prescribed topics included in the curriculum and the time constraints, they were committed to think of ways that fulfil students' curiosity and interests to know more even through extra-curricula activities.

Insightful as they were, the findings of this qualitative study cannot be generalisable, based – as they were – on a small number of interviewees, particularly, that representing 'Perry C' teachers. Neither was it possible in such a study to explore the significant importance of all of the emerging themes nor to explore in similar depth teachers of the Scottish context. These limitations formed the impetus of the final investigation.

13.2.4 Levers of Educational Change

AIM SIX and SEVEN

The cross-cultural investigation of the generalisability and the applicability of the themes that were identified as the major contextual barriers that are to affect teachers' belief formation and implementation had revealed great consistency in the patterns of the Egyptian and the Scottish teachers' responses. In both contexts, the majority of teachers expressed a degree of competence and positive perceptions with many of the questionnaire's discussed themes (i.e. their classroom teaching practices, their departmental ethos and their school ethos). Interestingly, not only did teachers of both contexts express a great concern with the many aspects of the current curriculum and assessment procedures, but also they singled them out to be the two areas in most need of educational reform. Both curriculum and assessment were considered the two strategic points of educational change.

13.2.5 Bringing it together: Ways of Breaking the Cycle of 'Perry A' beliefs

Findings from this study have shown that two paradigms of thinking and teaching exist within the Egyptian context – unlike the case with the Scottish counterpart. Whereas undergraduate (particularly in their first year) and postgraduate students revealed a progressive constructivist 'Perry C' thinking, the majority of teachers seemed to belong more to a reductionist objectivist 'Perry A' thinking. The Egyptian teachers' perceptions revealed that the latter paradigm is holding sway in the current educational system. The perceived top-down controlling hierarchy of the system seemed to nurture and support the acquisition and development of 'Perry A' thinking.

However, given that educators on each layer of the hierarchy had been once classroom teachers, this would imply a two-way influence rather than the linear top down one. Furthermore, by choosing to comply and reinforce the existing system, the majority of 'Perry A' educators and teachers are in actual reality perpetuating the system. The argument that they had been trained in or moulded to this way of thinking either through their previous school experiences, their university training or through the staff training they get throughout their career adds even more weight to this self-perpetuating cycle. Similar evidence of this concept of self-perpetuating cycle was highlighted in the findings from the follow-up interviews of the Egyptian undergraduates. When final year students expressed a strong sense of lacked motivation to get engaged and appreciate some recently introduced efforts of reform, they justified their stand by stating that they were not used to this way of teaching.

This cycle – within which individuals and the system are trapped – is a cycle of self-perpetuating beliefs that belong to a reductionist paradigm. In its essence, it is a cycle of beliefs that are based on a linear and mechanistic view of education and the world. In recent times, however, the understanding of how systems work has undergone profound changes "buffeted by research in the neuroscience, the reshaping of science itself, and massive and continuous shift in technology" (Caine & Caine, 1997c, p. 4). Metaphors of thinking about social systems as well as any other system have changed from the factory model to the living system: one that is more complex and sophisticated. It is, therefore, thought that it would be distressingly unimaginative to end this chapter without bringing together previous discussions of ways to break this cycle. This discussion is based on both the review of the relevant literature as well as the findings gained from this study.

The tensions and dilemmas that are caused by the clash between these two worlds of the old paradigm seeking survival and the new paradigm striving for existence and dominance are immense and drastic. Freire (2005) beautifully describes this notion of a 'paradigm' (Kuhn, 1962) or 'epoch' (Freire, 2005) shift. He also points to the consequences of being trapped in this cycle emphasising the need, during such times, for 'an especially flexible' and 'critical spirit'.

> If men are unable to perceive critically the themes of their time, and thus to intervene actively in reality, they are carried along on the wake of change. They see that the times are changing, but they are submerged in that change and so cannot discern its dramatic significance. And a society beginning to move from one epoch to another requires the development of an especially flexible, critical spirit. Lacking such a spirit, men cannot perceive the marked contradictions which occur in society as emerging values in search of affirmation and fulfilment clash with earlier values seeking self-preservation. The time of epochal transition constitutes an historical-cultural 'tidal-wave'. Contradictions increase between the ways of being, understanding, behaving, and valuing which belong to yesterday and other ways of perceiving and valuing which announce the future. As the contradiction deepen, the 'tidal-wave' becomes stronger and its climate increasingly emotional. This shock between a *yesterday* which is losing relevance but still seeking to survive, and a *tomorrow* which is gaining substance, characterizes the phase of transition as a time of announcement and a time of decision. (Freire, 2005, p. 6)

Rethinking the educational system

Freire (1973; 2005) believed that only by creating a permanently critical attitude can people become truly integrated with their time, become subjects – not objects – for change.

Findings from this study revealed that the majority of teachers of both contexts, the Egyptian and the Scottish, perceive themselves as 'the object' of educational change. Not only did they feel disempowered but also that their voices and suggestions for educational reform were not considered on a national level. Teachers, in both contexts, revealed a top-down centralised perception of the educational system. This perception is a reflection of what Freire views as a process of 'massification' where decision-making is confined to what he calls 'the elite' and the masses are unable to participate in societal decision-making. In such a context, human labour is reduced to a mechanical project, making the worker passive, naïve, and fearful (Freire, 1973, p. 34). He believes that the diminished agency of human subjects in massified and alienated societies encourages the people's incapacity to solve contextually-specific social problems. Instead, solutions to problems are imported from outside cultures and consistently prove inoperative and unfruitful: a view confirmed by Fullan's review of educational innovations worldwide (Fullan, 1993). Freire stresses that the failures emerging from the imported band-aid approaches to problems exacerbates hopelessness and dehumanisation among the people and deepens societal alienation. Whether or not Freire's analyses provide the reasons behind the Egyptian and the Scottish teachers' feelings of very slight hopefulness of the achievability of educational reform, his arguments seem to confirm that a radical rethinking of the nature of the educational system and how it works is a necessity if the reductionist cycle is to be broken.

From the interview accounts of the Egyptian teachers (Chapter Eleven) and the comments of the Scottish teachers (Chapter Twelve), a view of the educational system as a linear top-down hierarchy was dominant in teachers' perceptions (Figure 11.2). An alternative view of the educational system and its dynamics is proposed (Figure 11.4). In such a proposed

model, neither a centralised nor decentralised approach to educational reform is advocated. The educational system is, rather, perceived as a living system that recognises and appreciates the interconnectedness and wholeness of the involved themes. The relationships among these themes are not linear as they have "patterns of change that appear unpredictable because they are interconnected with their immediate environment. They are in relationship to each other, and they thrive on information. They act lawfully, but the laws they abide by appear 'messy'" (Caine & Caine, 1997c, p. 4). It is, therefore, important for an effective educational system to be flexible and open to change initiated by any and all of those involved in its dynamics: whether those are of 'the masses' or of 'the elite'. If such a philosophy is to be the agenda behind acts of change, this would foster empowerment, agency, create commitments and ownership of change and make 'subjects' of everyone involved in the system. In doing so, the critical attitude Freire stresses as essential for coping with paradigm or epoch shift would be reinforced as everyone involved in the system will be held important and accountable in making decisions and implementing them.

The recurrent, widespread and strong argument that teachers are major obstacles to educational reform because they are recalcitrant and reluctant to change can now be debated by posing the question 'who is directing this change?' Freire (2005) believes that "to the degree that the choices result from a critical perception of the contradictions are they real and capable of being transformed in action. Choice is illusory to the degree it represents the expectations of others" (p. 6). Teachers' resistance to change may be because they are unaware of the need for change, they do not initiate it, do not appreciate its importance, do not own it and, therefore, are not committed to it. Resistance could also be because change is often mandated or suggested by 'authorities' who are external to the setting in which teaching takes place: politicians, policy-makers, curriculum designers, administrators, etc. reflecting thus issues related to 'power' (Wasley, 1992; Wilber, 1995). Morimoto in (Morimoto, Gregory, & Butler, 1973) suggests "When change is advocated or demanded by another person, we feel threatened, defensive, and perhaps rushed. We are then without the freedom and the time to understand and to affirm the new learning as something desirable, and as something of our choosing. Pressure to change, without an opportunity for exploration and choice, seldom results in experiences of joy and excitement in learning" (p. 255). Answering the question posed earlier of 'who is directing change', it can be said that the advocated change innovation then "appears to be taken from the perspectives of those who are the change agents seeking to bring about change rather than of the clients they are seeking to influence" (Klein, 1969, p. 499).

In this research project, perceptions of change were looked at from teachers' standpoints in both the Egyptian and the Scottish contexts. In their accounts, teachers identified many themes or factors to be of great influence on their practices. This confirms the finding that what goes on inside the classroom is largely affected by what goes outside it on various levels: departments, school, local authorities, and policy-making. Nonetheless, of those factors, teachers in both contexts prioritised curriculum and assessment to be the two most

strategic leverage points of educational change. Not only did teachers consider them at the heart of thinking about educational reform, but also they considered assessment and curriculum as their key way into breaking the cycle.

Despite being the subject of a considerable number of reviews and changes (perhaps more than any of the other factors), the approaches applied to changing the curriculum and assessment have been from the mindset of the mechanistic, behavioural and hierarchical view of the system: such an approach rarely seemed to work (see discussion of chapter 11). A new mindset of thinking about change in the curriculum and the assessment framework should be adopted that would endorse the interconnected, dynamic, open and complex nature of the system. What is needed is "a different formulation to get to the heart of the problem, a different hill, so to speak" (Fullan, 1993, p. 3) that would place the student and teachers (whom the system exists to serve): their voices, interests, needs and suggestions at the centre of it where teachers are given the autonomy, the freedom and the time to act and challenge their beliefs, experiment, evaluate and reflect on them.

Studies (Richardson, 1990; Richardson et al., 1991) have proved that the changes teachers introduce, while often only minor adjustments, can be dramatic. However, this does not suggest what Richardson (1998) calls a "laissez faire" approach that is while teachers can make dramatic changes, they do not, then, need help, direction, or encouragement. Indeed, because teachers may "make decision about change that are spur-of-the-moment and based on unwarranted assumptions. Without examining the beliefs underlying a sense of what does or does not work, teachers may perpetuate practices based on questionable assumptions and beliefs...[and] If all teachers make decision autonomously, the schooling of an individual student could be quite incoherent and ineffective", Richardson suggests that help, direction and encouragement could be necessary. Such support could best be provided from a system that acts like a 'community of practice' rather than 'an authoritative figure'. What is required, then, is a change that balances both the autonomy with the community.

Addressing individuals' beliefs

Re-examining and restructuring the system in order to identify a way to break the cycle is extremely important as the system forms a force that exerts a cumulative impact on the beliefs and perceptions of those involved in it. To achieve such a restructuring, it is vital that the beliefs of all stakeholders: whether those would be politicians, students, teachers, local authority personnel, parents or head teachers (in no particular order), are accounted for. The importance of addressing beliefs in the process of change is emphasised by Caine & Caine's (1997a) view that "Although the system is at the eye of a storm, the basic belief on which the whole edifice is built remains largely unexamined by the public and the vast numbers of educators. Many of the protagonists [of education and educational reformation], therefore, don't know what they don't know" (p. 8-9).

Examining beliefs is crucial not only because beliefs are the unarticulated tacit assumptions upon which individuals perceive the world, evaluate and make decisions, but also because they were found to affect greatly individuals' preferences, approaches and actions. Albeit difficult, the findings from this research revealed that beliefs can and do change. The mechanism of this change is based on two keywords that Perry – as any other cognitive developmental theorist - has provided: disequilibrium and interaction (Chapter Five).

For change to take place, individuals have to be aware of the need for change. This happens when there is a degree of disequilibrium, perturbation, or what is known in the literature on attitudes as cognitive dissonance. In other words, it is the dissatisfaction with the status quo that could be considered as the impetus to initiates change. The context and experiences within which individuals interact, to a great extent, form, develop and challenge their beliefs. While some environmental events or conflicts facilitate change or what Perry calls 'accommodation', others get 'assimilated' resulting in no change to individuals' 'structures' or beliefs. It is important, then, in thinking about the kind of experiences student teachers or teachers – for example – are to get, to consider what Blocher (1978) has proposed. He suggested four conditions, that when met, accommodation is more likely to be facilitated. First, the issues have to be important to the individual to get them affectively involved. Second, issues should be presented in a way that takes a person's current way of making meaning into account. If the challenge is too far above the person's current level, assimilation is more likely to be the outcome. People seem unable to understand and make meaning of challenges that are more than one position (using Perry's terms) above their current level of making meaning. Third, individual differences must be taken into account. Fourth, issues should be presented in an atmosphere of support and feedback.

It is this community atmosphere of support, help and guidance that is held essential for individuals to create a 'shared vision' (Shaw & Jakubowski, 1991) and 'collective pictures' (Caine & Caine, 1997a) of how education should best be provided. It is an informed vision that is based on information and recent research. It starts from where societies are allowing everyone involved to project him/herself into the picture: a vision that has to be subject to constant reflection (figure 11.3).

13.3 The Journey Outlined: From Where to Where

To sum up, in the beginning of this research, the venture was to investigate critically why teachers teach the way they do. Informed by research on teachers and educational change, teachers' educational beliefs were thought of as the fundamental issue which determines educational change. By comparing the belief profiles of pre- and in-service teachers (using Perry's model) and by exploring the reasons behind the observed patterns of change, findings revealed such a view to be far too limited. Although findings confirmed the importance of the role teachers' beliefs play in changing teaching practices, other factors that function at an even deeper level were highlighted. The realisation that this study's

findings confirmed was that what goes on in classrooms does not operate in a vacuum as it is largely dependent on what goes on outside it. The educational system and how it functions form powerful forces that keep traditional classroom teaching in place. Considering the change process, then, could not be described in isolation without looking at the broader context of the educational 'system'. The basic beliefs upon which the whole system is constructed should be examined and questioned as teachers in both contexts, the Egyptian and the Scottish, identified many contextual barriers that hold them back from endorsing any different practices. Despite the importance of the collective effect of these factors, teachers – in the Egyptian and Scottish settings – prioritised the current assessment and curricular frameworks above all other factors to be in most need of change to facilitate and sustain any change in teachers' beliefs.

The realisations gained from such findings provide insights that could inform many educational practices and be the impetus of educational research. Some thoughts of both are presented next in the following two sections.

13.4 Recommendations for Educational Practice

In considering educational reform, it is important to note that by pointing the finger of blame at teachers' beliefs, the programs for teacher preparation and for teachers' continuous development along with the issues related to the nature of the educational system itself will be incriminated.

This section includes recommendations that are intended to throw light on the role they play to bring about the required change in any educational system.

13.4.1 Policy Making and The Educational System

Thinking about change should go beyond the 'individual deficit' mentality to the 'system deficit' one: a view that would involve an entire restructuring to the system that originates from communicating, discussing, understanding and working out the differences and any possible clashes that might come from the different perspectives and different ways of seeing the world.

- The findings of this study suggest that beliefs are important as they act as filter for how individuals perceive the world and subsequently interact with it. Opening up debates are essential for creating the atmosphere needed to examine beliefs, reflect on them and rethink taken-for-granted practices. This would help to create a system state of disequilibrium. This should involve all of those currently in positions of making decision and are potentially far from the reality of classrooms: local authority personnel, administrators, politicians, principals and head teachers.

- Genuine consultation and social negotiation whereby explicit public articulation, discussion and examination of beliefs underpinning the system will assist in the process of consensus building and of reconciliation of any differences: a

negotiation that is informed by recent research and makes use of recent technologies.

- Public negotiation of the system and the beliefs underpinning it can be accomplished by students', parents' and teachers' participation in the development of a school-based or district wide policies, in school improvement initiatives, and in the formulation of policies and decisions that affect school community.

- Throughout the educational systems, it is important to foster the culture of a community of practice rather than the command and control hierarchy.

- The findings of this study indicate that teachers perceive the system as deprofessionalising and disempowering them. They perceive themselves as not being considered in the process of making decisions when it comes to educational change. Better communication, then, would be required between teachers and others involved in the educational hierarchy. Not only the initiation of such communication channels is important but also raising teachers' awareness to their existence and to how to make full use of them.

- The educational system should provide teachers with more time, freedom and autonomy to teach in ways that they perceive best suit their students needs and interests. Teachers should be allowed to take charge particularly in issues related to the curriculum and the assessment frameworks. Such a responsibility, based on efficacy and trust, does not necessarily result in an abuse of power. This is particularly true if the ethos of departments and school is informative, supportive and constructive.

13.4.2 Teacher Education Programs (ITE) and Continuous Professional Development Modules (CPD)

Fullan (1993) believes that teacher education is "society's missed opportunity" (p. 104). He asserts, "Society has failed its teachers in two senses of the word. It gives teachers failing grades for not producing better results. At the same time, it does not help improve the condition that would make success possible" (p. 104). Part of the problem relies in what Fullan perceives as the lack of "a real belief or confidence that investing in teacher education will yield results. Perhaps deep down many leaders believe that teaching is not all that difficult. After all, most leaders have spent thousands of hours in the classroom and are at least armchair experts" (p. 104).

Indeed, findings from this study suggest that there were no significant difference between the beliefs profile of student teachers in their final year and postgraduates who come to teaching after being through another degree. Despite the rhetoric about teacher education and staff development, at various points in this study student teachers and teachers (particularly in the Egyptian context) expressed dissatisfaction with the preparation and support the concerned institutions provided. It seemed that not only did the system fail

teachers but also teacher educators and staff developers failed themselves by not creating and providing the conditions necessary to make change possible.

Because "high quality teaching...is the *sine qua non* of coping with dynamic complexity, i.e., of helping citizens who can manage their lives and relate to those around them in a continually changing world... [because] there is no substitute to having better teachers" (Fullan, 1993, p. 104), to follow are suggested recommendations that would help educators and staff developers facilitate breakthrough learning for teachers that are to be involved in educational restructuring.

- Student teachers' and teachers' educational beliefs and understanding of teaching and learning should be addressed and considered a major element of the content of their preparation process.

- Student teachers' and teachers' images, mental models of teaching and learning and previous school experiences should be reflectively examined in light of recent research and understandings.

- The process of preparation and support should not be about providing more add-ons, more methods or curriculum practices to be implemented but to provide teachers with the opportunities to talk about their beliefs, endorse alternatives and experiment with new practices.

- In providing support, educators and staff developers should never lose sight of where teachers are intellectually and ethically.

- Debating new alternatives should be considered from ethical and moral dimensions about teaching and schooling.

- So often teachers are asked to endorse certain beliefs and to provide certain practices that they had never experienced. It is the teacher educators' and staff developers' role to provide student teachers and teachers with learning experiences that do not only talk about these beliefs but also put them to practice. Experimental learning is proven to be most effective way of being engaged in learning and having a subsequent informed opinion and beliefs about that learning.

- Empowering student teachers and teachers should start from where they get their preparation and professional support. In such a context, the dominance should be to their voices. They should have a say in the process of learning. Educators and staff developers are to be seen as knowledgeable experts about current research and practices in the field. In short, they themselves should set the example of what they see as the best practice.

- In such courses, it is essential to create a constructive, safe and unthreatening atmosphere where the student teacher learner and the teacher learner form a network of encouragement, support and guidance

- It is crucial to provide enough support and mentoring especially to new teachers who are in the phase of transition from university to school.

- Last but not least, genuine "university-school system partnership" (Caine & Caine, 1997c, p. 195) or what Fullan (1993, p. 120) calls "university-school alliance" should be considered as a major priority. What would the point of graduating 'Perry C' type of teachers be if they would have to teach in schools and systems in which they find themselves as incompatible with the 'Perry A' expectations and parameters expected of them? These would be fruitless efforts, if systems sabotage any efforts but that which teaches linearly, using behavioural objectives for students and teaching for the test. School experiences and microteaching classes, then, should play great role in being the link that facilitates the gap between theory and practice. Not only should teacher educators and staff developers use them to introduce the reality of schools, but also to help student teachers and teachers with the skills required to initiate change and survive any belief regression or passive socialising effects.

13.5 Recommendations for Educational Research

Recommending further educational research studies is presented in two sections. The first section proposes research studies that are based on some identified methodological limitations of the current study. The second section proposes ideas that take the research conducted here a step further or considers it from various perspectives.

13.5.1 Further Research Arising from the Limitations of this Study

The present study had a broad scope. As such, some methodological limitations were encountered. These concerns are identified. It is hoped that the emanated issues can form the basis of other research studies that aim at providing more insights through further investigations. Examples of these proposed studies are presented next.

- The investigation of the Scottish teachers' group was limited to those attending CPD courses in the Faculty of Education at Glasgow University. It was, therefore, difficult to gauge the extent to which this sample is typical of the wider Scottish teachers population. A research study that surveys the wider Scottish teacher population and compare their results to those presented here would be interesting.

- Because the number of the interviewed Scottish undergraduates was quite small, it was not possible to get more insight into what could be the reasons behind the discrepancies noticed between their pattern of responses and that anticipated by

Perry. It is thought, therefore, that interviewing more Scottish undergraduates would be helpful to gain such an insight.

- Because of the sequential nature of this investigation, it was not possible to identify certain teachers to be the subjects of the investigations that were to follow. Results, then, were based on addressing the same group rather than the particular individuals. Considering that in a future study might shed light on some interesting findings.

- In hindsight, the Egyptian teachers' interviews account raised some points that are thought of as important to be further investigated and explored. An example of this is the comments made by some teachers that they perceive other teachers - who come to teaching from a different route than the traditional one - as more competent and perhaps efficient in teaching than they perceive themselves to be. Further examination of such a comment, how common is it among teachers and why is it so would be a fascinating study.

13.5.2 Further Research Recommendations

Second, other than the proposed studies above, presented next are some other areas that might be explored by further research.

- A longitudinal study of a group of BEd students throughout their university years and when they go to teach in schools.

- It is also interesting to explore the difference of the educational beliefs among groups of undergraduate students from various degrees and compare them with graduates from education programs. This would throw more light on what causes the development: is it the effect of university experience or special courses provided presumably to enhance and develop these beliefs?

- Investigating if teachers' years of teaching experiences have any effect on their educational beliefs or on what they perceive affect their belief change.

- Investigating if teachers' gender has any effect on teachers' educational beliefs or what is perceived to affect belief change.

- Investigating if there are any differences between the beliefs of teachers teaching at different sectors: primary or secondary, mainstream or special needs.

- It would be interesting to have a closer look at the beliefs of teachers from Perry's different thinking positions in action perhaps by using different methodology, like conducting classroom observation.

- It would be interesting – instead of focusing on what went wrong with Perry A' thinking teachers – to conduct a closer investigation at instances where things went

right: that is why 'Perry C' teachers are resilient and survive the system whereas others do not?

- It would be interesting as well to investigate further the effect of the ethos of departments and school on the beliefs of teachers and head teachers. Does the shared ethos affect the beliefs of the school staff?

- The data gathered from the Scottish context was when the 5-14 curriculum was in place. It would be interesting to see if teachers under the recently introduced 'Curriculum for Excellence' still share the same views.

- It would also be interesting to explore what teachers, in both contexts, think of as the ideal curriculum and assessment framework that they believe would benefit their students most.

Bibliography

Bibliography

Abelson, R. P. (1979). Differences between belief systems and knowledge systems. *Cognitive Science, 3*, 355-366.

Adams, R. S., & Chen, C. (1981). *The process of educational innovation: An international perspective*. London: Kogan Page.

Agee, J. (1998). Negotiating different conceptions about reading and teaching literature in a pre-service literature class. *Research in the Teaching of English, 33*, 85-121.

Ajzen, I. (1985). From intentions to action: A theory of planned behaviour. In J. Kuhl & J. Beckman (Eds.), *Action control: From cognition to behaviour* (pp. 11-39). New York: Springer.

Ajzen, I. (1988). *Attitudes, personality and behaviour*. Buckingham: Open University Press.

Ajzen, I. (2002). *Constructing a TpB questionnaire: Conceptual and methodological considerations*. Retrieved 1st December, 2007, from http://www.people.umass.edu/aizen

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, NJ: Prentice Hall.

Al Kafas, W. (2004). *The impact of the nature and form of questions on the learning strategies (using Pask's model) and the quality of the outcome: An experimental study*. Paper presented at the 11th annual conference, Ain Shams University [Original in Arabic].

Alexander, P. A., & Dochy, E. J. (1995). Conceptions of knowledge and beliefs: A comparison across varying cultural and educational communities. *American Educational Research Journal, 32*, 413-442.

Alexander, P. A., Schallert, D. L., & Hare, V. C. (1991). Coming to terms: How researchers in learning and literacy talk about knowledge. *Review of Educational Research, 61*(3), 315-343.

Alhodery, S. A. (2005). *Attitudes and difficulties in upper school physics in Libya*. Unpublished Master dissertation, University of Glasgow, Glasgow.

Al-Lawati, Z. H. (2003). *The physics curriculum at secondary level in the Sultanate of Oman*. Unpublished Master dissertation, University of Glasgow, Glasgow.

Allen, R. (1983). *Research on changes in intellectual development and critical thinking ability*. Washington, DC: National Science Foundation.

Allport, G. (1935). Attitudes. In M. Fishbein (Ed.), *Readings in attitude theory and measurement* (pp. 1-13). New York: John Wiley & Sons.

Al-Qasmi, S. A. (1999). *Computer assisted learning in biology.* Unpublished Master dissertation, University of Glasgow, Glasgow.

Al-Qasmi, S. A. (2006). *Problem solving in biology at university level.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Al-Shibli, A. A. S. (2003). *A study of science student teachers' perceptions of learning in the education colleges in the Sultanate of Oman.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Al-Weher, M. (2004). Constructing constructivism: How student teachers construct ideas of development, knowledge, learning and teaching. *Asia-Pacific Journal of Teacher Education, 32*(2), 169-184.

Amarel, M., & Feiman-Nemser, S. (1988). *Prospective teachers' views of teaching and learning to teach.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Anderson, R. C., & Mitchener, C. P. (1994). Research on science teacher education. In D. C. Gabel (Ed.), *Handbook of research on science teaching and learning* (pp. 3-44). New York: Macmillan.

Anderson, R. C., Reynolds, R. E., Schallert, D. L., & Goetz, E. T. (1977). Frameworks for comprehending discourse. *American Educational Research Journal, 14*, 367-382.

Anderson, R. D. (1995). Curriculum reform: Dilemmas and promise. *Phi Delta Kappan, 77*(1), 33-37.

Anderson, R. D. (1996). *Study of curriculum reform.* Washington DC: U.S. Government Printing Office (ISBN 0-16-048865-6).

Anderson, R. D., & Helms, J. V. (2001). The ideal of standards and the reality of schools: Needed change. *Journal of Research in Science Teaching, 38*(1), 3-16.

Anning, A. (1988). Teachers' theories about children's learning. In J. Calderhead (Ed.), *Teachers' professional learning* (pp. 128-145). London: Falmer.

Arksey, H., & Knight, P. (1999). *Interviewing for social scientists.* London: Sage.

Arlin, P. K. (1975). Cognitive development in adulthood: A fifth stage? *Developmental Psychology, 11*, 602-606.

Armour-Thomas, E. (1989). The application of teacher cognition in the classroom: A new teaching competency. *Journal of Research and Development in Education, 22*(3), 29-37.

Ary, D., Jacobs, L., & Razavieh, A. (1972). *Introduction to research in education.* New York, USA: Holt, Rhinehart & Winston Inc.

Ary, D., Jacobs, L., Razavieh, A., & Sorensen, C. (2006). *Introduction to research in education.* Belmont, Calif: Thomson/Wadsworth.

Avis, J. (2003). Re-thinking trust in a performative culture: The case of education. *Journal of Education Policy, 18*(3), 315-332.

Babbie, E. (1992). *The practice of social research* (6th ed.). Belmont, NJ: Wadsworth.

Babbie, E. (1995). *The practice of social research* (7th ed.). Belmont, NJ: Wadsworth.

Babbie, E. (2004). *The practice of social research* (10th ed.). Belmont, NJ: Wadsworth.

Bahaa El Din, H. K. (1997). *Education and the future.* Kayoub, Egypt: Al Ahram Commercial Press.

Bailey, D., Conn, T., Hanks, B., & Werner, L. (2003). *Can we influence students' attitudes about inspections? Can we measure a change in attitude?* Paper presented at the 16th conference on software engineering education and training (CSEE&T), Madrid, Spain.

Bailyn, B. (1963). Education as a discipline. In J. Walton & L. J. L. (Eds.), *The discipline of education* (pp. 126-129). Madison: University of Wisconsin Press.

Ball, D. L. (1989). *Breaking with experience in learning to teach mathematics: What do they bring with them to teacher education?* Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Ball, S. (1990). *Politics and policy making in education: Exploration in policy sociology.* London: Routledge.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1992). *Self-efficacy mechanism in sociocognitive functioning.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Barker, R. G. (1968). *Ecology psychology: Concepts and methods for studying the environment of human behavior.* Stanford, Calif: Stanford University Press.

Barnes, P. (2005). *The changing nature of Higher Education: As academics is it our responsibility to ensure that our students are employable, or are we 'simply' educators?* Paper presented at the Theorising and Performing Knowledge: Teaching, Learning and Research, Glasgow, Scotland.

Bartsch, U. (1995). *Rates of return to investment in education and migration in Egypt.* Cairo: Almishkat Centre for Research and Training.

Baxter Magolda, M. B. (1987a). Comparing open-ended interviews and standarized measures of intellectual development. *Journal of College Student Personnel, 28*(5), 443-448.

Baxter Magolda, M. B. (1987b). A rater-training program for assessing intellectual development on the Perry scheme. *Journal of College Student Personnel, 28*(4), 356-364.

Baxter Magolda, M. B. (1988). Measuring gender differences in intellectual development: A comparison of assessment methods. *Journal of College Student Development, 29*, 528-537.

Baxter Magolda, M. B. (1990). The impact of the freshman year on epistemological development: Gender differences. *Review of Higher Education, 13*, 259-284.

Baxter Magolda, M. B. (1992). *Knowing and reasoning in college: Gender-related patterns in students' intellectual development.* San Francisco: Jossey-Bass.

Baxter Magolda, M. B. (1995). The integration of relational and impersonal knowing in young adults' epistemological development. *Journal of College Student Development, 36*, 205-216.

Baxter Magolda, M. B. (2001). *Making their own way: Narratives for transforming higher education to promote self-development.* Sterling, VA: Stylus.

Baxter Magolda, M. B. (2002). Epistemological reflection: The evolution of epistemological assumptions from age 18 to 30. In B. K. Hofer & P. R. P. (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing.* Mahwah, N.J., London: L. Erlbaum Associates.

Baxter Magolda, M. B., & Porterfield, W. (1988). *Intellectual development: Linking theory and practice.* Washington, DC: American College Personnel Association.

Bean, T. W., & Zulich, J. (1992). A case study of three preservice teachers' beliefs about content area reading through the window of student-professor dialogue journals. In C. Kinzer & D. J. Leu (Eds.), *Literacy research, theory and practice: Views from many perspectives* (pp. 463-474). Chicago: National Reading Conference.

Beaty, L. (1997). *Developing your teaching through reflective practice.* Birmingham: SEDA.

Beck, L., Trombetta, W., & Share, S. (1986). Using focus sessions before decisions are made. *North Carolina Medical Journal, 47*(2), 73-74.

Becker, H. S., & Geer, B. (1957). Participant observation and interviewing: A comparison. *Human Organization, 16*(3), 28-32.

Beder, H. (1991). Purposes and philosophies in adult education. In S. B. Merriam & P. M. Cunningham (Eds.), *Handbook of adult and continuing education* (pp. 37-50). San Francisco: Jossey-Bass.

Belenky, M., Clinchy, B., Goldberger, N., & Tarule, J. (1986). *Women's ways of knowing: the development of self, voice, and mind.* New York: Basic Books.

Bendixen, L. D. (2002). A process model of epistemic belief change. In B. K. Hofer & P. R. Pintrich. (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 191-208). N.J.; London: L. Erlbaum Associates.

Bendixen, L. D., Schraw, G., & Dunkle, M. E. (1998). Epistemic beliefs and moral reasoning. *Journal of Psychology, 13*, 187-200.

Ben-Peretz, M. (1990). Research on teacher education in Israel: Topics, methods and findings. In R. Tisher & M. Wideen (Eds.), *Research in teacher education* (pp. 207-225). London: Falmer.

Bertaux, D. (Ed.). (1981). *Biography and society: The life history approach in the social sciences.* Beverly Hills, CA: Sage.

Biggs, J. (1987). *Student approaches to learning and studying.* Hawthorn, Australia: Australian Council for Educational Research.

Biggs, J. (1999). *Teaching for quality learning at university: What the student does.* Buckingham: Society for Research into Higher Education: Open University Press.

Birdsall, N., & O'Connel, L. (1999). *Globalisation, income distribution and education: Putting education to work in Egypt.* Cairo: Egyptian Centre for Economic Studies.

Birnbaum, A. (1968). Some latent trait models and their use in inferring an examinee's ability. In F. M. Lord & M. R. Novick (Eds.), *Statistical theories of mental test scores* (pp. 395-479). Reading, MA: Addison-Wesley.

Blocher, D. H. (1978). Campus learning environments and the ecology of student development. In J. H. Banning (Ed.), *Campus ecology: A perspective for student affairs* (pp. 17-23). Columbus, Ohio: National Association of Student Personnel Administrators.

Blom, T. E. (1984). Response to Maxine Hairston, "The winds of change: Thomas Kuhn and the revolution in the teaching of writing". *College Composition and Communication, 35*(4), 489-493.

Bloom, A. (1987). *The Closing of the American Mind: How higher education has failed democracy and impoverished the souls of today's students.* New York; London: Simon and Schuster.

Bogardus, E. S. (1926). The group interview. *Journal of Applied Sociology, 10*, 372-382.

Bogardus, E. S. (2003). The group interview. In N. Fielding (Ed.), *Interviewing* (Vol. I, pp. 83-89). London: Sage.

Bogdan, R. C., & Biklen, S. (2007). *Qualitative research for education: An introduction to theories and methods* (5th ed.). Boston, Mass: Pearson A & B.

Bolin, F. (1990). Helping student teachers think about teaching: Another look at Lou. *Journal of Teacher Education, 41*(1), 10-19.

Bouchard, T. T. (1976). Unobtrusive measures: An inventory of uses. *Sociological Methods and Research*(4), 267-300.

Bowen, H. R. (1977). *Investment in learning: The individual and social value of American Higher Education.* San Francisco; London: Jossey-Bass.

Boyd, R. (1994). Scientific realism and naturalistic epistemology. In J. Worrall (Ed.), *The ontology of science* (pp. 97-146). Brookfield, VT: Dartmouth.

Boyes, M. C., & Chandler, M. (1992). Cognitive development, epistemic doubt, and identity formation in adolescence. *Journal of Youth and Adolescence, 21*(3), 277-303.

Braud, W., & Anderson, R. (1998). *Transpersonal research methods for the social sciences: Honoring personal experience.* London: Sage Publications.

Breckler, S. J. (1984). 'Empirical validation of affect, behaviour, and cognition as distinct components of attitude'. *Journal of Personality and social Psychology, 47*, 1191-1205.

Brewer, J., & Hunter, A. (2006). *Foundations of multimethods research: Synthesizing styles.* Thousand Oaks, CA: Sage.

Briggs, C. L. (1986). *Learning to ask: A sociolinguistic appraisal of the role of the interview in social science.* Cambridge: Cambridge University Press.

Bristol, T., & Fern, E. F. (1996). Exploring the atmosphere created in focus group interviews: Comparing consumers' feelings across qualitative techniques. *Journal of the Market Research Society, 38*(2), 185-195.

Britzman, D. (1991). *Practice makes practice: A critical study of learning to teach.* Albany: State University of New York Press.

Brooks, G. P. (1998). *Perry: Fact, fiction, and outcomes assessment.* Paper presented at the The meeting of the Mid-Western Educational Research Association, Chicago, IL.

Brooks, J. G., & Brooks, M. G. (1999). *In Search of Understanding: The Case for Constructive Classrooms.* Alexandria, Virginia: Association for Supervision and Curriculum Development.

Broughton, J. M. (1975). *The development of natural epistemological childhood.* College of Education, Harvard University, Massachusetts.

Broughton, J. M. (1981). Piaget's structural development psychology: I. Piaget and structuralism. *Human Development, 24*, 78-109.

Brown, C. A., & Cooney, T. J. (1982). Research on teacher education: A philosophical orientation. *Journal of Research and Development in Education, 15*(4), 13-18.

Brownlee, J. (2003). Changes in primary school teachers' beliefs about knowing: A longitudinal study. *Asia-Pacific Journal of Teacher Education, 31*(1), 87-98.

Brownlee, J., Purdie, N., & Boulton-Lewis, G. (2001). Changing epistemological beliefs in pre-service teacher education students. *Teaching in Higher Education, 6*(2), 247-268.

Bruner, J. (1996). *The culture of education.* Cambridge, MA: Harvard University Press.

Bruner, J. (1999). Folk pedagogies. In J. Leach & B. Moon (Eds.), *Learners and pedagogy.* London: Paul Chapman Publishing.

Bryce, T. G. K., & Humes, W. M. (Eds.). (1999). *Scottish education.* Edinburgh: Edinburgh University Press.

Bryman, A. (1988a). *Doing research in organisations.* London: Routledge.

Bryman, A. (1988b). *Quantity and quality in social research.* London: Routledge.

Bryman, A. (1992). Quantity and quality research: Further reflections on their integration. In J. Brannen (Ed.), *Mixing methods: Qualitative and quantitative research* (pp. 3-37). Aldershot: Avebury.

Bryman, A. (2004). *Social research methods.* Oxford: Oxford University Press.

Buczynski, P. L. (1991). The relationship between identity and cognitive development in College freshmen: A structural equation modelling analysis. *Journal of College Student Development, 32*(3), 212-222.

Bullough, R., Knowles, J., & Crow, N. (1992). *Emerging as a teacher*. London: Routledge.

Bullough, R. V., & Baughman, K. (1997). *"First year teacher" eight years later: An inquiry into teacher development*. New York: Teachers College Press.

Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research, 65*, 245-281.

Byrne, M. S. (1985). *A study of the development of critical-mindedness in tertiary level students through the use of science based interactive learning units*. Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Caine, G., Caine, R. N., & Crowell, S. (1999). *Mindshifts, a brain-compatible process for professional development and the renewal of education* (2nd ed.). Tucson: Zephyr Press.

Caine, R. N., & Caine, G. (1997a). *Education on the edge of possibility*. Alexandria, VA: Association for Supervision and Curriculum Development.

Caine, R. N., & Caine, G. (1997b). *Understanding why education must change*. Retrieved 14th May, 2006, from http://www.newhorizons.org/trans/caine_change.htm

Caine, R. N., & Caine, G. (1997c). *Unleashing the power of perceptual change: The potential of brain-based teaching*. Alexandria, VA: Association for Supervision and Curriculum Development.

Calderhead, J. (1987). The contribution of field experience to student primary teachers' professional learning. *Research in Education, 40*, 33-49.

Calderhead, J. (1996). Teachers: Beliefs and Knowledge. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 709-724). New York: Macmillan Library Reference.

Calderhead, J., & Robson, M. (1991). Images of teaching: Student teachers' early conceptions of classroom practice. *Teaching and Teacher Education, 7*, 1-8.

Campbell, & Bickard. (1986). *Knowing levels and developmental stages*. Basil, Switzerland: Karger.

Campbell, D., & Stanley, J. (1963). Experimental and quasi-experimental design for research in teaching. In N. L. Gage (Ed.), *Handbook of research on teaching* (pp. 171-246). Chicago: Rand McNally.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.

Cannon, W. B. (1914). The emergency function of the adrenal medulla in pain and the major emotions. *American Journal of Physiology, 33*, 356-372.

Carlsen, W. S. (1991). Subject-matter knowledge and science teaching: A pragmatic perspective. In J.E. Brophy (Ed.), *Advances in research on teaching* (115-143). Greenwich, CT: JAI Press.

Carroll, M. (2005). *Experience, intention and practice in the teaching of 5-14 primary science.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Chaiken, S., & Eagly, A. H. (1993). *The psychology of attitudes.* San Diago: Harcourt Bruce Jovannovich.

Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of interviews research* (2nd ed., pp. 509-535). Thousand Oaks, Calif: Sage.

Chi, M. T. H., De Leeuw, N., Chiu, M., & La Vancher, C. (1994). Eliciting self-explanations improves understanding. *Cognitive Science, 18*, 439-477.

Chickering, A. W. (1969). *Education and identity.* San Francisco: Jossey-Bass.

Chickering, A. W., & associates. (1981). *The modern American college.* San Francisco: Jossey-Bass.

Child, D. (2004). *Psychology and the teacher* (7th ed.). London: Routledge.

Chiu, C., Hong, Y., & Dweck, C. S. (1994). Toward an integrative model of personality and intelligence: A general framework and some preliminar steps. In R. Sternberg & P. Ruzgis (Eds.), *Personality and Intelligence* (104-136). Cambridge: Cambridge University Press.

Civil, M. (1993). Prospective elementary teachers' thinking about teaching mathematics. *Journal of Mathematical Behavior, 12*, 79-109.

Clandinin, J. (1986). *Classroom practice: Teacher images in action.* London: Falmer.

Clandinin, J., & Connelly, F. M. (1987). Teachers' personal knowledge: What counts as 'personal' in studies of the personal. *Journal of Curriculum Studies, 18*, 487-500.

Clandinin, J., & Connelly, F. M. (1991). Narrative and story in practice and research. In D. Schon (Ed.), *The reflective turn: Case studies in and on educational practice* (258-281). New York: Teachers College Press.

Clark, B. R., & Trow, M. (1966). The organizational context. In T. M. Newcomb & E. K. Wilson (Eds.), *college peer groups: Problems and prospects for research* (17-70). Chicago: Aldine.

Clift, R. (1987). English teacher or English major: Epistemological differences in the teaching of English. *English Education, 19*, 229-236.

Clinchy, B. (2002). Revisiting women's ways of knowing. In B. K. Hofer & P. R. Pintrich. (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (63-88). Mahwah, N.J.; London: L. Erlbaum Associates.

Clinchy, B., Lief, J., & Young, P. (1977). Epistemological and moral development in girls from a traditional and progressive high school. *Journal of Educational Psychology, 69*(4), 337-343.

Cobb, P., Wood, T., & Yackle, E. (1990). Classrooms as learning environments for teachers and researcher. In R. Davis, C. Maher & N. Noddings (Eds.), *Constructivist views on the teaching and learning of mathematics* (pp. 125-146). Reston: National Council of Teachers of Mathematics.

Cochran-Smith, M. (1991). Reinventing student teaching. *Journal of Teacher Education, 42*(2), 104-118.

Cohen, E. G. (1994). Restructuring the classroom: Conditions for productive small groups. *Review of Educational Research, 64*(1-35).

Cohen, L., & Manion, L. (1994). *Research methods in education* (4th ed.). London: Routledge.

Colby, A., & Kohlberg, L. (1987). *Measurement of moral judgment.* New York: Cambridge University Press.

Coll, R. K., & Taylor, T. G. N. (2001). Using constructivism to inform tertiary chemistry pedagogy. *Chemistry Education: Research and practice in Europe, 2*(3), 215-226.

Collins, K. M. T., Onwuegbuzie, A. J., & Sutton, I. L. (2006). A model incorporating the rationale and purpose for conducting mixed methods research in special educational and beyond. *Learning Disabilities: A Contemporary Journal*(4), 67-100.

Collinson, V. (1996). *Staff development through inquiry: Opening a Pandora's box of teachers beliefs.* Paper presented at the Annual Meeting of the Association of Teacher Educators, St. Louis, MO.

Commons, M. L. (2004). Guest editor: The State of the Art on Perry and Epistemological Development? An Introduction. *Journal of Adult Development, 11*(2).

Commons, M. L., Armon, C., Richards, F. A., Schrader, D. E., Farrell, E. W., Tappan, M. B., et al. (1989). A multidomain study of adult development. In M. L.Commons, J. D. Sinnott, F. A. Richards & C. Armon (Eds.), *Adult development: Comparisons and applications of developmental models* (pp. 33-56). New York: Praeger.

Commons, M. L., Danaher-Gilpin, D., Miller, P. M., & Goodheart, E. A. (2002). *Hierarchical complexity scoring system: How to score anything.* Unpublished scoring manual: Available from Dare Institute, commons@tiac.net.

Cone, J., & Foster, S. (1993). *Dissertations and theses from start to finish.* Washington: American Psychological Association.

Connelly, F. M., & Clandinin, J. (1988). *Teachers as curriculum planner: Narratives of experience.* Toronto: Ontario Institute for Studies in Education Press.

Cooper, M. A. (1999). Classroom choices from a cognitive perspective on peers learning. In M. A. O'Donnell & A. King (Eds.), *Cognitive perspectives on peer learning* (pp. 215-234) Hillsdale, NJ.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA: Sage.

Crow, N. (1988). *A longitudinal study of teacher socialization: A case study.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Crow, N., Levine, L., & Nager, N. (1990). No more business as usual: Career changers who become teachers. *American Journal of Education, 98*(3), 197-223.

Cunningham, J. W., & Fitzgerald, J. (1996). Epistemology and reading. *Reading Research Quarterly, 31*, 947-954.

Danili, E. (2004). *A study of assessment formats and cognitive styles related to school chemistry.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Darling-Hammond, L. (1997). *The right to learn: A blueprint for creating schools that work.* San Francisco: Jossey-Bass.

Datta, L. (1994). Paradigm wars: A basis for peaceful coexistence and beyond. In C. S. Reichardt & S. F. Rsllis (Eds.), *Qualitative-quantitative debate: New perspectives* (pp. 53-70). San Francisco: Jossey-Bass.

Davis, N. T., McCarty, B. J., & Sidani-Tabbaa, A. (1993). Transition from objectivism to constructivism in science education. *International Journal of Science Research, 15*(6), 627-636.

Dawson, T. (2004). Assessing intellectual development: Three approaches one sequence. *Journal of Adult Development, 11*, 71-85.

De Alba, A., Gonzalez-Guadiano, E., Lankshear, C., & Peter, M. (2000). *Curriculum in the postmodern condition*. New York: Peter Lang.

Deci, E. L., Schwartz, A. J., Sheinman, L., & Ryan, R. M. (1981). An instrument to assess adults' orientations toward control versus autonomy with children: Reflections on intrinsic motivation and perceived competence. *Journal of Educational Psychology, 73*(5), 642-650.

Deci, E. L., Spiegel, R. M., Ryan, R. M., Koestner, R., & Kauffman, M. (1982). Effects of performance standards on teaching styles: Behavior of controlling teachers. *Journal of Educational Psychology, 74*(6), 852-859.

Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods*. New York: Praeger.

Denzin, N. K., & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 1-17). Thousand Oaks, CA: Sage.

Derry, S. J. (1996). Cognitive schemes theory in the constructivist debate. *Educational Psychologist, 31*, 163-174.

DeVellis, R. F. (1991). *Scale development*. Newbury Park, CA: Sage Publications.

Dewey, J. (1933). *How we think*. Boston: D. C. Heath.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*(125), 276-302.

DiVesta, F. I. (1966). A developmental study of the semantic structures of children. *Verbal Learning and Verbal Behavior, 5*, 249-259.

Douglas, J. (1985). *Creative interviewing*. Beverly Hills, CA: Sage.

Draper, J. A. (2001). Philosophies embedded in adult education. In T. Barer-Stein & M. Kompf (Eds.), *The craft of teaching adults* (3rd ed., pp. 151-165). Toronto: Irwin/Cultural Concepts.

Duell, O., & Schommer, M. (2001). Measures of people's beliefs about knowledge and learning. *Educational Psychology Review, 13*(4), 417-447.

Duffy, G., & Roehler, L. (1986). Constraints on teacher change. *Journal of Teacher Education, 35*(55-58).

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040-1048.

Dweck, C. S. (2000). *Self-theories: Their role in motivation, personality, and development.* Philadelphia, PA: Psychological Press.

Dweck, C. S., & Bempechat, J. (1983). Children's theories of intelligence: Consequences for learning. In S. G. Paris & H. W. Stevenson (Eds.), *Learning and motivation in the classroom* (pp. 239-256). Hillsdale, NJ: Erlbaum.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.

Dwyer, D., Ringstaff, C., & Sandholtz, J. (1992). *Teacher beliefs and practice part 1: Patterns of change. The evolution of teachers' instructional beliefs and practices in high-access-to-technology classrooms first & fourth year findings.* California: Apple computer Inc.

Dyer, C. (1995). *Beginning research in psychology.* Oxford: Blackwell.

Dzurec, L. C., & Abraham, J. L. (1993). The nature of inquiry: Linking quantitative and qualitative research. *Advances in Nursing Science*(16), 73-79.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes.* Orlando, Florida: Harcourt Brace College.

Edwards, A. L. (1957). *Techniques of attitude scale construction.* New York: Appleton-Century-Crofts.

Edwards, A. L., & Kenney, K. C. (1946). A comparison of the Thurstone and Likert techniques of attitude scale construction. *Journal of Applied Psychology, XXX*, 72-83.

Eisenhart, M., Shrum, J., Harding, J., & Cuthbert, A. (1988). Teachers beliefs: Definitions, findings and directions. *Educational Policy, 2*, 51-70.

Eisler, R. (1987). *The Chalice and the blade.* San Francisco: Harper and Row.

Eisner, E. W. (1979). *The educational imagination: On the design and evaluation of school programs.* New York: MacMillan.

English, L. D., & Halford, G. S. (1995). *Mathematics education: Models and processes.* Mahwah, New Jersey: Lawrence Erlbaum Associates.

Entwistle, N., Skinner, D., & Entwistle, D. (2000). *The nature and possible origins of conceptions of 'good teaching' among student teachers.* Paper presented at the European Conference on Educational Research, Edinburgh.

Entwistle, N., & Walker, P. (1999). Strategic alertness and expanded awareness within sophisticated conceptions of teaching. *Instructional Science, 28*, 335-361.

Entwistle, N., & Walker, P. (2002). Strategic alertness and expanded awareness within sophisticated conceptions of teaching. In N. Hativa & P. Goodyear (Eds.), *Teacher thinking: Beliefs and knowledge in higher education* (pp. 15-39). London: Kluwer Academic Publishers.

Erickson, E. H. (1950). *Childhood and society*. New York: Norton.

Ernest, P. (1988). *The implicit of beliefs on the teaching of mathematics*. Paper presented at the ICME VI, Budapest, Hungary.

Ernest, P. (1995). The one and the many. In L. P. Steffe & J. Gale (Eds.), *Constructivism in education* (pp. 459-486). Hillsdale, NJ: Lawrence Erlbaum Associates.

Erwin, T. D. (1983). The Scale of Intellectual Development: Measuring Perry scheme. *Journal of College Student Personnel, 24*, 6-12.

Evans, B., & Honour, L. (1997). Getting inside knowledge: The application of Entwistle's Model of surface/deep processing in producing open learning materials. *Educational Psychology, 17*(1/2), 127-139.

Evans, N. J. (1996). Theories of student development. In S. R. Komives, D. B. Woodard & Associates (Eds.), *Student services: A handbook for the profession* (3 ed., pp. 164-187). San Francisco: Jossey Bass.

Eysenck, H. J. (1962). Response set, authoritarianism, and personality questionnaires. *British Journal of Social and Clinical Psychology, I*, 20-24.

Fam, R. (1999). (Personal Communication).

Fang, Z. (1996). A review of research on teacher beliefs and practices. *Educational Research, 38*(1), 47-65.

Featherstone, H. (1993). Learning from the first years of classroom teaching: The journey in, the journey out. *Teacher College Record, 95*(1), 93-112.

Feiman-Nemser, S., & Buchmann, M. (1989). Describing teacher education: A framework and illustrative findings from a longitudinal study of six students. *The Elementary School Journal, 89*(3), 365-377.

Feiman-Nemser, S., McDiarmid, G., Melnick, S., & Parker, M. (1989). *Changing beginning teachers' conceptions: A description of an introductory teacher education course*. East Lansing: National Centre for Research on Teacher Education: College of Education, Michigan State University.

Fenstermacher, G. (1979). A philosophical consideration of recent research on teachers' effectiveness. In L. S. Shulman (Ed.), *Review of research in education* (Vol. 6, pp. 157-185). Itasca, IL: Peacock.

Fenstermacher, G. (1994). The place of practical arguments in the education of teachers. In V. Richardson (Ed.), *Teacher change and the staff development process: A case in reading instruction* (pp. 23-42). New York: Teacher College Press.

Fergany, N. (1998). *Human Capital and Economic Performance in Egypt*. Cairo: Egypt.

Fern, E. F. (1982). The use of focus groups for idea generation: The effect of group size, acquaintanceship and moderator on response quantity and quality. *Journal of Marketing Research, 26*(February), 1-13.

Feuerstein, R., Klein, P. S., & Tannenbaum, A. J. (1994). *Mediated learning experience (MLE): Theoretical, psychosocial and learning implications*. London: Freund.

Fielding, N. (1982). Observational research on the national front. In M. Blumer (Ed.), *Social Research Ethics*. London: Macmillan.

Fielding, N. (2003). *Interviewing*. London: Sage.

Finster, D. C. (1989). Developmental instruction: Part 1.Model of intellectual development. *Journal of chemical education, 66*(8), 659-661.

Fishback, S. J. (1997). *The cognitive development of adult undergraduate students*. Unpublished doctoral dissertation, Kansas State University, Manhattan, Kansas.

Fishbein, M. (1976). A consideration of beliefs, and their role in attitude measurement. In M. Fishbein (Ed.), *Reading in attitude theory and measurement* (Vol. 257-266). New York: John Wiley & Sons.

Fishbein, M., & Ajzen, I. (1974). Attitudes toward objects as predictors of single and multiple behavioral criteria. *Psychological Review, 81*, 59-74.

Fitzgerald, J., & Cunningham, J. W. (2002). Mapping basic issues for identifying epistemological outlooks. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 209-230). Mahwah, N.J.; London: L. Erlbaum Associates.

Florio-Ruane, S., & Lensmire, T. J. (1990). Transforming future teachers' ideas about writing instruction. *Journal of Curriculum Studies, 22*, 277–289.

Ford, M. E. (1992). *Motivating humans: Goals, emotions, and personal agency beliefs*. Newbury Park, CA: Sage.

Forde, C., McMahon, M., McPhee, A. D., & Patrick, F. (2006). *Professional development, reflection and enquiry*. London: Paul Chapman Publishing.

Fraenkel, J., & Wallen, N. (2000). *How to design & evaluate research in education*. New York, USA: McGraw-Hill Companies.

Fredrickson, B. L. (2006). Unpacking positive emotions: Investigating the seeds of human flourishing. *The Journal of Positive Psychology, 1*(2), 57-59.

Fredrickson, B. L., & Losada, M. F. (2005). Positive emotions and the complex dynamics of human flourishing. *American Psychologist*(60), 678-686.

Freebody, P. (2003). *Qualitative research in education: Interactions and practice*. Thousand Oaks, CA: Sage.

Freire, P. (1972). *Pedagogy of the oppressed*. Harmondsworth: Penguin.

Freire, P. (1973). *Education as the practice of freedom in education for critical consciousness*. New York: Continuum.

Freire, P. (2005). *Education for critical consciousness*. London: Continuum.

Frey, J. H., & Fontana, A. (1991). The group interview in social research. *The Social Science Journal, 28*(2), 175-187.

Fullan, M., & Hargreaves, A. (1992). *What's worth fighting for in your school? : Working together for improvement*. Buckingham: Open University Press in association with Ontario Public School Teachers' Federation.

Fullan, M. G. (1991). *The new meaning of educational change*. New York: Teachers College Press.

Fullan, M. G. (1993). *Change forces: Probing the depths of educational reform*. London: Falmer Press.

Gage, N. L. (1963). The paradigm wars their aftermath: A "historical" sketch of research on teaching since 1989. *Educational Researcher, 18*(7), 4-10.

Gage, N. L. (1989). The paradigm wars their aftermath: A "historical" sketch of research on teaching since 1989. *Educational Researcher, 18*(7), 4-10.

Gaita, R. (2000). Re-enchantment of learning. *The Australian's Review of Books*(March), 11-13.

Gardner, H. (1983). *Frames of mind*. New York: Basic Books.

Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.

Gardner, P. L. (1995). Measuring attitudes to science: unidimensionality and internal consistency revisited. *Research in Science Education, 25*(3), 283–289.

Garner, R., & Alexander, P. A. (1991). *Skill, will, and thrill: Factors in adults' text comprehension.* Paper presented at the meeting of the American Educational Research Association, Chicago, IL.

Gauker, C. (2002). *Language and Thought.* Retrieved 19th September, 2006, from http://host.uniroma3.it/progetti/kant/field/lat.htm

Gay, L. (1981). *Educational research: Competencies for analysis and application* (2nd ed.). Ohio: Charles E. Merrill Publishing Co.

Gerth, H., & Mills, C. W. (1953). Character and social structure: The psychology of social institutions. San Diego: Harvest/HBJ.

Gess-Newsome, J. (1999). Secondary teachers' knowledge and beliefs about subject matter and their impact on instruction. In J. Gess-Newsome & N. G. Lederman (Eds.), Examining Pedagogical Content Knowledge: The Construct and Its Implications for Science Education (pp. 51-95). Dordrecht, Netherlands: Kluwer Academic.

Ghani, S. A. (2004). *A study of student teachers' performance and psychological characteristics in learning introductory statistics.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Giere, R. (1999). *Science without laws.* Chicago: University of Chicago Press.

Gilligan, C. (1981). Moral development. In A. W. Chickering & Associates (Eds.), *The modern American college: Responding to the new realities of diverse students and a changing society* (pp. 139-157). San Francisco: Jossey-Bass.

Ginsburg, H. P., & Opper, S. (1988). *Piaget's theory of intellectual development.* Englewood Cliffs, NJ: Prentice-Hall, Inc.

Glaser, B. G. (1992). *Basics of grounded theory analysis.* Mill Vally, CA: Sociology Press.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research.* New York: Aldine De Gruyter.

Goldberger, N. R., Tarule, J., Clinchy, B., & Belenky, M. (Eds.). (1996). *Knowledge, difference, and power: Essays inspired by Women's Ways of Knowing.* New York: Basic Books.

Goleman, D. (1996). *Emotional intelligence: why it can matter more than IQ.* London: Bloomsbury.

Goleman, D. (2004). *Emotional intelligence, why it can matter more than IQ: Working with emotional intelligence*. London: Bloomsbury.

Goodenough, W. (1963). *Cooperation in change*. New York: Russell Sage Foundation.

Goodman, J. (1988). Constructing a practical philosophy of teaching: A study of preservice teachers' professional perspectives. *Teaching and Teacher Education, 4*, 121-137.

Goodson, I., & Walker, R. (Eds.). (1991). *Biography, Identity, Schooling: Episodes in educational research*. London: Falmer Press.

Gore, J. (1993). *The struggle for pedagogies: Critical and feminist discourse of regimes of truth*. New York: Routledge.

Greembaum, T. L. (1993). *The practical handbook and guide to focus research* (Revised ed.). Lexington, MA: Lexington.

Green, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-methods evaluation designs. *Educational Evaluation and Policy Analysis*(11), 255-274.

Green, R. F., & Goldfried, M. R. (1965). On the bipolarity of the semantic space. *Psychological Monographs, 79*(6), Whole No. 599.

Green, T. (1971). *The activities of teaching*. New York: McGraw-Hill.

Greene, J. C., & Caracelli, V. J. (1997). Defining and describing the paradigm issue in mixed-method analysis. In J. C. Greene & V. J. Caracelli (Eds.), *Advances in mixed-methods evaluation: the challenge and benefits of integrating diverse paradigms* (pp. 5-17). San Francisco: Jossey-Bass.

Greeno, J. G., Collins, A. C., & Resnick, L. (1996). Cognition and learning. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 15-46). New York: MacMillan.

Greer, M. A. (1997). *Measuring constructivist teaching practices in first and third grades*. Unpublished doctoral dissertation, University of Toledo, Ohio.

Griffin, A. H. (1986). Thinking in education yesterday, today and tomorrow. *Education, 106*(3), 268-280.

Griffith, B. E., & Benson, G. D. (1994). Scientific thought as dogmatism. *International Journal of Science Education, 16*(6), 625-637.

Gross, S. (2004). Program evaluation: Issues in survey design. *Leadership Review, Spring*. Available online at http://www.leadershipreview.org/2004/spring/article2002_spring_2004.asp.

Grossman, P. L. (1990). *The making of a teacher: Teacher knowledge and teacher education.* New York: Teacher College Press.

Grossman, P. L., & Richert, A. (1988). Unacknowledged knowledge growth: A re-examination of the effect of teacher education. *Teaching and Teacher Education, 4*(1), 53-62.

Grossman, P. L., & Stodolsky, S. S. (1995). Content as context: The role of school subjects in secondary school teaching. *Educational Researcher, 24*, 5-11.

Grossman, P. L., Valencia, S. W., Evans, K., Thompson, C., Martin, S., & Place, N. (2000). Transitions into teaching: Learning to teach writing in teacher education and beyond. *Journal of Literacy Research, 32*, 631-662.

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation.* Newbury Park, CA: Sage.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: Sage.

Guskey, T. (1986). Staff development and the process of teacher change. *Educational Research, 15*(5), 5-12.

Guttman, L. (1941). The quantification of a class of attributes: A theory and method of scale construction. In P. Horst (Ed.), *The predication of personal adjustment* (Vol. Bulletin No. 48, pp. 319-348). New York: Social Science Research Council.

Hacking, I. (1983). *Representing and intervening: Introductory topics in the philosophy of natural science.* New York: Cambridge University Press.

Hacking, I. (2000). *The social construction of what?* Cambridge, MA: Harvard University Press.

Hadden, R. A. (1981). *The change of attitudes to science through the primary/secondary schools interface.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Hadley, T., & Graham, J. W. (1987). The influence of cognitive development on perceptions of environmental press. *Journal of college Student Personnel, 28*(5), 338-394.

Haghanikar, M. M. (2003). *Understanding and accessibility in physics.* Unpublished Master dissertation, University of Glasgow, Glasgow.

Halfpenny, P. (1979). The analysis of qualitative data. *Sociological Review*(27), 799-825.

Hammer, D., & Elby, A. (2002). On the form of personal epistemology. In B. K. Hofer & P. R. Pintrich. (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 169-190). Mahwah, N.J.; London: L. Erlbaum Associates.

Hammersley, M. (1989). By what criteria should ethnographic research be judged? In M. Hammersley (Ed.), *What's wrong with ethnography* (pp. 57-84). London: Routledge.

Hammersley, M. (1996). The relationship between qualitative and quantitative research: Paradigm loyalty versus methodological eclecticism. In J. T. E. Richardson (Ed.), *Handbook of research methods for psychology and the social sciences* (159-174). Leicester: BPS Books.

Haney, J. J., & McArthur, J. (2002). Four case studies of prospective science teachers' beliefs concerning constructivist teaching practices. *Science Education, 86*(6), 783-802.

Hanson, G. (1983). Critical issues in the assessment of student development. In G. Hanson (Ed.), *New directions for student services: Measuring student development* (Vol. 20, pp. 47-63). San Francisco: Jossey-Bass.

Hardy, M. D., & Taylor, P. C. (1997). Von Glaserfeld's radical constructivism: A critical review. *Science and Education, 6*, 135-150.

Hargreaves, A., Earl, L., Moore, S., & Manning, S. (2001). *Learning to change: Teaching beyond subjects and standards*. San Francisco: Jossey-Bass.

Hargreaves, A., & Fullan, M. G. (Eds.). (1992). *Teacher development and educational change*. London: Falmer Press.

Harker, L. A., & Keltner, D. (2001). Expressions of positive emotion in women's college yearbook pictures and their relationship to personality and life outcomes across adulthood. *Journal of Personality and Social Psychology*(80), 112-124.

Harris, K. R., & Alexander, P. A. (1998). Integrated, constructivist education: Challenges and reality. *Educational Psychology Review, 10*, 115-128.

Harvey, J. M. (1994). *An investigation into ways of encouraging the development of higher level cognitive skills in undergraduate biology with reference to the Perry Scheme of intellectual Development.* Unpublished doctoral dissertation, University of Napier, Edinburgh.

Harvey, O. J. (1986). Belief systems and attitudes toward the death penalty and other punishments. *Journal of Psychology, 54*, 143-159.

Hatab, F. A. (1996). *Mental Abilities* (5th ed.). Cairo: The Egyptian Anglo Library [Original in Arabic].

Heise, D. R. (1965). Semantic differential profiles for 1,000 most frequent English words. *Psychological Monographs, 79*(106), 1-31.

Heise, D. R. (1969). Some methodological issues in semantic differential research. *Psychological Bulletin, 72*(6), 406-422.

Heise, D. R. (1970). The semantic differential and attitude research. In G. F. Summers (Ed.), *Attitude measurement* (pp. 235-253). Chicago: Rand McNally.

Hess, J. M. (1968). Group interviewing. In R. L. King (Ed.), *New science of planning* (pp. 51-84. Chicago: American Marketing Association.

Hiemstra, P. (1988). Translating personal values and philosophy into practical action. In R. G. Brockett (Ed.), *Ethical issues in adult education* (pp. 178-194). New York: Columbia University, Teachers College.

Himmelfarb, S., & Eagly, A. H. (Eds.). (1974). *Readings in attitude change*. New York: Wiley.

Hofer, B. (2001). Personal epistemology research: Implications for learning and teaching. *Educational Psychology Review, 13*(4), 353-383.

Hofer, B. K. (2002). Personal Epistemology as a psychological and educational construct: An introduction. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 3-14). Mahwah, N.J.; London: L. Erlbaum Associates.

Hofer, B. K. (2004a). Guest editor Introduction: Paradigmatic approaches to personal epistemology. *Educational Psychologist, 39*(1).

Hofer, B. K. (2004b). Introduction: Paradigmatic approaches to personal epistemology. *Educational Psychologist, 39*(1), 1-3.

Hofer, B. K., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research, 67*(88-140).

Hofer, B. K., & Pintrich, P. R. (Eds.). (2002). *Personal epistemology: The psychology of beliefs about knowledge and knowing*. Mahwah, N.J.; London: L. Erlbaum Associates.

Hogan, D. M., & Tudge, J. R. H. (1999). Implication of Vygotsky's theory for peer learning. In M. A. O'Donnell & A. King (Eds.), *Cognitive perspectives on peer learning* (pp. 39-65). Mahwah, NJ.: Erlbaum.

Hogg, M. A., & Vaughan, G. M. (1995). *Social psychology: An introduction.* London: Prentice Hall.

Holland, J. L. (1973). *Making vocational choices: A theory of careers.* New Jersey: Prentice-Hall.

Hollingsworth, S. (1989). Prior beliefs and cognitive change in learning to teach. *American Educational Research Journal, 26*(2), 160-189.

Hollon, R. E., & Anderson, C. W. (1987). *Teachers' beliefs about students' learning processes in science: Self-reinforcing belief systems.* Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.

Hopson, B., & Scally, M. (1981). *Lifeskills teaching.* London: McGraw-Hill.

House, E. R. (1994). Integrating the quantitative and qualitative. In C. S. Reichardt & S. F. Rsllis (Eds.), *Qualitative-quantitative debate: New perspectives* (pp. 13-22). San Francisco: Jossey-Bass.

Hoy, W. (1967). Organizational socialization: The student teacher and pupil control ideology. *The Journal of Educational Research, 61*, 153-259.

Hoy, W., & Rees, R. (1977). The bureaucratic socialization of student teachers. *Journal of Teacher Education, 28*(1), 23-26.

Hoy, W., & Woolfolk, A. (1990). Socialization of student teachers. *American Educational Research Journal, 27*(2), 279-300.

Huey-Ling, L., & Gorrell, J. (2002). The Road to pre-service teachers' conceptual change. *Educational Research Quarterly, 26*(2), 54-65.

Hughes, J. A. (1990). *The philosophy of social research.* Harlow: Longman.

Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence* (2nd ed.). New York: Basic Books.

Ivanitskaya, L., Clark, D., Montgomery, G., & Primeau, R. (2002). Interdisciplinary learning: Process and outcome. *Innovative Higher Education, 27*(2), 95-111.

Jacob, P. E. (1957). *Changing values in college.* New Haven: Edward W. Harper Foundation.

Jarrar, S. A., & Massialas, B. G. (1992). Arab Republic of Egypt. In J. Cookson, A. R. Sadovnik & S. F. Semel (Eds.), *International handbook of educational reform* (pp. 149-167). New York: Greenwood Press.

Jenkins, J. J., Russell, W. A., & Suci, G. J. (1957). An atlas of semantic profiles for 360 words. *American Journal of Psychology, 71*, 688-699.

Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*(24), 602-611.

John, P. D. (1991). A qualitative study of British student teachers' lesson planning perspectives. *Journal of Education for Teaching, 17*, 301-320.

John, P. D. (1996). Understanding the apprenticeship of observation in initial teacher education: exploring student teachers' implicit theories of teaching and learning. In G. Claxton, Terry Atkinson, M. Osborn & M. Wallace (Eds.), *Liberating the learner: Lessons for professional development in education* (pp. 90-107). New York: Routledge.

Johnson, B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Towards a definition of mixed methods research. *Journal of Mixed Methods Research, 1*(2), 112-133.

Johnston, A. (1982). Attitude measurement in chemistry: Pitfalls and pointers. *Chemistry Education: Implications for teaching, (London, Royal Society of Chemistry)*, 90-103.

Johnston, M. (1987). *The body in the mind: The bodily basis of meaning*. Chicago, IL: University of Chicago Press.

Johnstone, A. (1998). *Evaluation of innovation: A case study*. Hull: Project Improve, hefc Fund for the Development of Teaching and Learning.

Johnstone, A., & Reid, N. (1981). Towards a model for attitude change. *European Journal of Science Education, 3*(2), 205-212.

Jones, R. (1994). Realism about what? In J. Worrall (Ed.), *The ontology of science* (pp. 275-292). Brookfield, VT: Dartmouth.

Jung, C. G. (1923). *Psychological types*. New York: Harcourt, Brace.

Jung, E. S. (2005). *Attitude and learning difficulties in middle school science in South Korea*. Unpublished Master dissertation, University of Glasgow, Glasgow.

Kagan, D. M. (1992). Implications of research on teacher belief. *Educational Psychologist, 27*(1), 65-90.

Kardash, C. M., & Scholes, R. J. (1996). Effects of pre-existing beliefs, epistemological beliefs, and need for cognition on interpretation of controversial issues. *Journal of Educational Psychology, 88*, 260-271.

Katz, D., & Sarnoff, I. (1954). The motivational basis of attitude change. *Journal of Abnormal and Social Psychology, 49*, 115-124.

Katz, D., & Stotland, E. (1959). A preliminary statement to a theory of attitude structure and change. In S. Koch (Ed.), *Psychology: A study of a science* (pp. 423-475). New York: McGraw-Hill.

Kegan, R. (1982). *The evolving self: Problems and process in human development.* Cambridge, MA: Harvard University Press.

Kelchtermans, G. (1993). Getting the story, understanding the lives: From career stories to teacher's professional development. *Teaching and Teacher Education, 9*(6), 443-456.

Kennedy, M. M. (1997). *Defining an ideal teacher education program [mimeo].* Washington, DC: National Council for the Accreditation of Teacher Education.

Kerlinger, F. N. (1967). Social attitudes and their criterial referents: A structural theory. *Psychological Review, 74*, 110-122.

Kerlinger, F. N. (1970). *Foundations of behavioural research.* New York: Holt, Rinehart & Winston.

Kerlinger, F. N. (1973). *Foundations of behavioural research* (2nd ed.). London: Holt, Rinehart & Winston.

Kile, R. (1993). *Preconceptions of elementary and secondary preservice teachers.* Unpublished doctoral dissertation, University of Arizona, Tucson.

Kincheloe, J., Slattery, P., & Steinberg, S. (2000). *Contextualzing teaching.* New York: Longman.

King, A. (1993). Getting from the "Sage on Stage" to the "Guide on the Side". *College Teaching, 41*, 30-35.

King, P., & Kitchener, K. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults.* San Francisco: Jossey-Bass.

King, P., & Kitchener, K. (2002). The reflective judgment model: Twenty years of research on epistemic cognition. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 37-62). Mahwah, N.J., London: L. Erlbaum Associates.

King, P. M. (1977). *The development of reflective judgement and formal operational thinking in adolescents.* Dissertation abstracts international: University of Minnesota, Minnesota.

King, P. M. (1978). William Perry's theory of intellectual and ethical development. In L. Knefelkamp, C. Widick & C. A. Parker (Eds.), *New directions for student services: Applying new developmental findings* (Vol. 4, pp. 35-51). San Fransico: Jossey-Bass.

King, P. M. (1982, Nov.). *Perry's scheme and the reflective judgment model: First cousins once removed.* Paper presented at the Annual conference of association for moral education, Minneapolis, Minn.

King, P. M. (2003). Student learning in higher education. In S. R. Komives, D. B. Woodard & Associates (Eds.), *Student services: A handbook for the profession* (Vol. 4, pp. 234-268). San Francisco: Jossey Bass.

King, P. M., & Baxter Magolda, M. B. (1996). A developmental perspective on learning. *Journal of College Student Development, 37*(163-173).

King, P. M., Kitchener, K. S., Wood, P. K., & Davison, M. L. (1989). Relationship across developmental domains: A longitudinal study of intellectual, moral, and ego development. In M. L.Commons, J. D. Sinnott, F. A. Richards & C. Armon (Eds.), *Adult development: Comparisons and applications of developmental models* (Vol. 1, pp. 57-72). New York: Praeger.

Kinnear, P. R., & Gray, C. D. (2000). *SPSS for windows made simple (Release 10).* East Sussex: Psychology Press Ltd Publishers.

Kitchener, K. S. (1986). The reflective judgment model: Characteristics, evidence, and measurement. In R. A. Mines & K. S. Kitchener (Eds.), *Adult cognitive development: Methods and models* (pp. 76-91). New York: Praeger.

Kitchener, K. S., & Fischer, K. W. (1990). Kitchener, K. S., & Fischer, K. W. (1990). A skill approach to the development of reflective thinking. In D. Kuhn (Ed.), *Contributions to human development: Vol. 21. Developmental perspectives on teaching and learning thinking skills* (pp. 48-62). New York: Karger.

Kitchener, K. S., & King, P. M. (1981). Reflective judgment: Concepts of justification and their relationship to age and education. *Journal of Applied Development Psychology, 2*, 89-116.

Kitchener, K. S., & Kitchener, R. F. (1981). The development of natural rationality: Can formal operation account for it? In J. A. Meachom (Ed.), *Social development: Cognitive development perspectives* (160-181). White Plains, NY: S. Karger Press.

Kitchener, R. F. (1983). Cognition, metacognition, and epistemic cognition. *Human Development, 26*, 222-232.

Klausmeier, H. J. (1985). *Educational psychology*. New York: Harper and Row.

Klein, D. (1969). Some notes on the dynamics of resistance to change: The defender role. In W. Bennis & R. Chin (Eds.), *The planning of change* (pp. 498-507). New York: Holt: Rinehart and Winston, Inc.

Klien, P. (1996). Preservice teachers' beliefs about learning and knowledge. *The Alberta Journal of Educational Research, XLII*(4), 361-377.

Knapper, C., & Cropley, A. (1985). *Lifelong learning and higher education*. London: Groom-Helem.

Knefelkamp, L. (1974). *Developmental instruction: Fostering intellectual and personal growth of college students*. Dissertation Abstract International, 36, 1271A.

Knefelkamp, L. (1999). Introduction. In W. Perry (Ed.), *Forms of intellectual and ethical development in the college years: A scheme* (pp. xi-xxxviii). New York: Holt, Rinehart and Winston.

Knefelkamp, L., & Cornfeld, J. L. (1979). *Combining student stage and style in the design of learning environments.* Paper presented at the annual meeting of the American College Personnel Association, Los Angeles.

Knefelkamp, L., Widick, C., & Parker, C. A. (1978a). Editors note: Why bother with theory? In L. Knefelkamp, C. Widick & C. A. Parker (Eds.), *New directions for student services: Applying new developmental findings*. Francisco: Jossey-Bass Inc.

Knefelkamp, L., Widick, C., & Parker, C. A. (1978b). *New directions for student services: Applying new developmental findings*. Francisco: Jossey-Bass Inc.

Knodel, J. (1995). Focus group research on the living arrangements of elderly in Asia. *Journal of Cross-Cultural Gerontology, 10*(whole issue), 1-162.

Knowles, J. (1992). Models for understanding preservice and beginning teachers' biographies: Illustrations from case studies. In I. F. Googson (Ed.), *Studying teachers' live* (pp. 51-98). London: Falmer.

Kohlberg, L. (1958). *The development of modes of moral thinking and choice in the years ten to sixteen.* Unpublished PhD, University of Chicago, Chicago.

Kohlberg, L. (1969). Stage and sequence: The cognitive developmental approach to socialization. In D. Goslin (Ed.), *Handbook of socialization theory and research* (347-480). Chicago: Rand McNally.

Kohn, A. (1993). *Punishing by rewards: The trouble with gold stars, incentive plans, A's, praise, and other bribes*. New York: Houghton Mifflin.

Kolb, D. A. (1976). *Learning styles inventory technical manual.* Boston: McBer.

Korthagen, F. A. J. (1988). The influence of learning orientations on the development of reflective teaching. In J. Calderhead (Ed.), *Teachers' professional learning* (pp. 35-50). Philadelphia: Falmer.

Korthagen, F. A. J., & Kessels, J. P. A. M. (1999). Linking theory and practice: Changing the pedagogy of teacher education. *Educational Researcher, 28*(4), 4-17.

Koschmann, T. (1996). Paradigm shifts and instructional technology: An introduction. In T. Koschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm* (pp. 1-23). Hillsdale, NJ: Lawrence Erlbaum Associates.

Kothandapani, V. (1971). Validation of feeling, belief, and intention to act as three components of attitude and their contribution to prediction of contraceptive behavior. *Journal of Personality and Social Development, 19*, 321-333.

Krech, D., & Crutchfield, R. (1948). *Theory and problems of social psychology.* New York: McGraw-Hill.

Krech, D., Crutchfield, R., & Ballachey, R. (1962). *Individual in society.* New York: McGraw-Hill.

Krueger, R. A. (1993). Quality control in focus group research. In D. L. Morgan (Ed.), *Successful focus groups: Advancing the state of the art* (pp. 65-85). Thousand Oaks, CA: Sage.

Kuhn, D. (1991). *The Skills of Argument.* New York: Cambridge University Press.

Kuhn, D., Cheney, R., & Weinstock, M. (2000). The development of epistemological understanding. *Cognitive Development, 15*(3), 309-328.

Kuhn, D., & Weinstock, M. (2002). What is epistemological thinking and why does it matter? In B. K. Hofer & P. R. Pintrich. (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 121-144). Mahwah, N.J.: London: L. Erlbaum Associates.

Kuhn, T. S. (1962). *The structure of scientific revolutions.* Chicago; London: Chicago University Press.

Kuhn, T. S. (1970). *The structure of scientific revolutions.* Chicago; London: Chicago University Press.

Kurfiss, J. (1977). Sequentiality and structure in a cognitive model of college student development. *Developmental Psychology, 13*(6), 565-571.

Kvale, S. (1996). *Interviews: An introduction to qualitative research interviewing.* Thousand Oaks, CA: Sage.

Langer, E. (1989). *Mindfulness.* Reading, Mass: Addison-Wesley Publishing Company.

Lansing, J. B., Ginsburg, G. P., & Baraaten, K. (1961). *An investigation of response error.* University of Illinois: Bureau of Economic and Business Research.

Lavallee, M., Beland, A., Bouchard, L., & Levesque, M. (1988). A structural comparison between operational and cognitive -ethical levels in the adult college student. *Revue Ouebecoise de Psychologie, 9*(3), 27-46.

Lave, J., & Wegner, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.

LeCompte, M. D., & Schensul, J. J. (1999). *Designing and conducting ethnographic research.* Walnut Creek, CA: AltaMira Press.

Lehmann, I. J. (1980). Measuring affect. *Australian Educational Researcher, 7*(3), 29-52.

Lehnert, W. (1984). Paradigmatic issues in cognitive science. In W. Kintsh, J. Miller & P. Polson (Eds.), *Methods and tactics in cognitive science* (pp. 21-49). Hillsdale, NJ: Lawrence Erlbaum Associates.

Leinhardt, G. (1988). Situated knowledge and expertise in teaching. In J. Calderhead (Ed.), *Teachers' professional learning* (pp. 146-168). London: Falmer.

Levin, B. (2003). *Case studies of teacher development: An in-depth look at how thinking about pedagogy develops over time.* London: L. Erlbaum Associates.

Levin, B. B., & Ammon, P. R. (1992). The development of beginning teachers' pedagogical thinking: A longitudinal analysis of four case studies. *Teacher Education Quarterly, 19*(4), 19-37.

Levin, B. B., & Ammon, P. R. (1996). A longitudinal study of the development of teachers' pedagogical conceptions: The case of Rick. *Teacher Education Quarterly, 23*(4), 5-25.

Lewin, K. (1936). *Principles of typological psychology.* New York: McGraw-Hill.

Lewis, H. (1990). *A question of value.* San Francisco: Harper & Row.

Likert, R. (1932). A Technique for the measurement of attitudes. *Archives of Psychology*(140), 5-55.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Beverly Hills, CA: Sage.

Little, J. W. (1993). Professional community in comprehensive high school: The two worlds of academic and vocational teachers. In J. W. Little & M. W. McLaughlin (Eds.), *Teachers' work: Individuals, colleagues, and contexts* (pp. 137-163). New York: Teachers College Press.

Locke, K. (1996). Rewriting the discovery of grounded theory after 25 years? *Journal of Management Inquiry, 5*, 239-245.

Locke, L. (1989). Qualitative research as a form of scientific inquiry in sport and physical education. *Research Quarterly for Exercise and Sport, 60*(1), 1-20.

Loevinger, J. (1976). *Ego development: Conceptions and theories.* San Francisco: Jossey-Bass.

Lofland, J. (1971). *Analyzing Social settings: A guide to qualitative observation and analysis.* Belmont, Calif: Wadsworth.

Lofland, J., & Lofland, L. (1995). *Analyzing social settings: A guide to qualitative observation and analysis* (3rd ed.). Belmont, Calif: Wadsworth.

Lortie, D. (1975). *Schoolteacher: A sociological study.* Chicago: The University of Chicago Press.

Love, P. G., & Guthrie, V. L. (1999a). Synthesis, assessment, and application: Understanding and applying cognitive development theory. *New Directions for Student Services, 88*(77-93).

Love, P. G., & Guthrie, V. L. (1999b). Understanding and applying cognitive development theory. *New Directions for Student Services, 88.*

Mackenzie, A. M. (1999). *Prescription for change: medical undergraduates' perceptions of learning in traditional and problem-based courses.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Marcia, J. D. (1966). Development and Identity status. *Journal of Personality and Social Development, 3*, 551-558.

Marlowe, B. A., & Page, M. L. (1998). *Creating and sustaining the constructivist classroom.* California: Corwin press.

Marrs, H. (2005). *Culture, epistemology, and academic studying.* Unpublished doctoral dissertation, Kansas State University, Manhattan, Kansas.

Marshall, J. (1981). Making sense as a personal process. In P. Reason & J. Rowan (Eds.), *Human inquiry* (pp. 395-399). New York: Wiley.

Martin, J. (1964). Acquiescence - measurement and theory. *British Journal of Social and Clinical Psychology, III*, 216-225.

Martin, J. E., Silva, D. G., Newman, J. H., & Thayer, J. F. (1994). An investigation into the structure of epistemological style. *Personality and Individual Differences, 16*(4), 617-629.

Matthews, M. R. (1994). Discontent with constructivism. *Studies of Science Education, 24*, 165-172.

Mayher, J. (1990). *Uncommon sense*. Portsmouth, NH: Heinemann.

McBride, R. A. a. (undated). *Supporting the in-service education of Egyptian teachers in a British University: Working across cultures*. Retrieved 13th January, 2007, from http://www.Tntee.umu.se

McCracken, G. (1988). *The long interview*. Beverly Hills, CA: Sage.

McCrae, R. R., & Costa, P. T. (1996). Toward a new generation of personality theories: Theoretical contexts for the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 51-87). New York: Guilford.

McLaughlin, M. W. (1993). What matters most in teachers' workplace context? In J. W. Little & M. W. McLaughlin (Eds.), *Teachers' work: Individuals, colleagues, and contexts* (pp. 79-103). New York: Teachers College Press.

McQuarrie, E. F. (1996). *The market research toolbox*. Thousand Oaks, CA: Sage.

Mellon, C., & Sass, E. (1981). Perry and Piaget: Theoretical framework for effective college course development. *Educational Technology, 39*(9), 1047-1052.

Miles, M. B. (1979). Qualitative data as an attractive nuisance. *Administrative Science Quarterly, 24*, 590-601.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). London: Sage.

Minewiser, L. D. (2001). *Eliciting mental models: Images of teaching and learning*. Unpublished doctoral dissertation,, University of Saybrook, San Francisco.

Mishler, E. G. (1991). Representing discourse: The rhetoric of transcription. *Journal of Narrative and Life History, 1*(4), 255-280.

Modriz, E. (2000). Focus group in feminist research. In Y. Sessions & N. Denzin (Eds.), *Handbook of qualitative research* (2nd ed., pp. 835-850). Thousand Oaks, CA: Sage.

Moo. (1973). Conceptualizations of human environment. *American Psychologist, 28*, 652-665.

Moore, A. (2000). *Teaching and learning: Pedagogy, curriculum and culture*. London: Routledge Falmer.

Moore, W. S. (1989). The learning environment preference: Exploring the construct validity of an objective measure of the Perry scheme of intellectual development. *Journal of College Student Development, 30*(6), 504-514.

Moore, W. S. (2002). Understanding learning in a postmodern world: Reconsidering the Perry scheme of ethical and intellectual development. In B. K. Hofer & P. R. Pintrich. (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 17-36). Mahwah, N.J.; London: L. Erlbaum Associates.

Moore, W. S., & Hunter, S. (1993). Beyond "mildly interesting facts": Student self-evaluations and outcomes assessment. In J. MacGregor (Ed.), *New directions for teaching and learning: No. 56. Student self-evaluation: Fostering reflective learning* (pp. 65-82). San Francisco: Jossey-Bass.

Mordkoff, A. M. (1965). Functional vs. nominal antonymy in semantic differential scales. *Psychology Reports, 16*, 691-692.

Morgan, D. L. (1988). *Focus groups as qualitative research*. Thousand Oaks, CA: Sage.

Morgan, D. L. (1996). Focus groups. *Annual Reviews of Sociology*(22), 129-152.

Morgan, D. L. (1998a). *Planning focus groups*. Thousand Oaks, Calif: Sage.

Morgan, D. L. (1998b). Practical strategies for combining qualitative and quantitative methods: Applications for health research. *Qualitative Health Research, 8*, 362-376.

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research, 1*(1), 48-76.

Morgan, D. L., & Krueger, R. A. (1993). When to use focus groups and why. In D. L. Morgan (Ed.), *Successful focus groups: Advancing the state of the art* (pp. 35-50). Thousand Oaks, CA: Sage.

Morimoto, K., Gregory, J., & Butler, P. (1973). Notes on the context for learning. *Harvard Educational Review, 10*(4), 245-257.

Morse, J. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*(40), 120-123.

Morton, F., & Saljo, R. (1976). Symposium: Learning processes and strategies - II, on qualitative differences in learning - II, outcome as a function of the learner's conception of the task. *British Journal of Educational Psychology, 46*, 115-127.

Mostyn, B. (1985). The content analysis of qualitative research data: A dynamic approach. In M. Brenner & D. Canter (Eds.), *The research interview: Uses and approaches* (pp. 115-145). London: Academic Press.

Mubarak, H. (1993). *Mubarak and Education: The national project for developing education*. Cairo: Egypt [Original in Arabic].

Mubarak, H. (1999). *Mubarak and Education: The national project for developing education*. Cairo: Egypt [Original in Arabic].

Muis, K. R., Bendixen, L. D., & Haerle, F. C. (2006). Domain-generality and domain-specifity in personal epistemology research: Philosophical and empirical reflections in the development of a theoretical framework. *Educational Psychology Review, 18*, 3-54.

Munby, H. (1982). The place of teachers' beliefs in research on teacher thinking and decision making, and an alternative methodology. *Instructional Science, 11*, 201-225.

Munby, H., Russell, T., & Martin, A. (2001). Teachers' knowledge and how it develops. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed., pp. 877-904). Washington: DC: AERA.

Myers, I. B. (1962). *The Myers-Briggs type Indicator*. Palo Alto, CA: Consulting Psychologists Press.

Nasr, M. A. (1976). *A study of the affective domain in school science*. Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Nespor, J. (1987). The role of beliefs in the practice of teaching. *Journal of Curriculum Studies, 19*(4), 317-328.

Newman, D., Griffin, P., & Cole, M. (1989). *The constructive zone: Working for cognitive change in school*. Cambridge, MA: Cambridge University Press.

Nias, J. (1989a). *Primary teachers talking: A study of teaching as work*. New York: Routledge.

Nias, J. (1989b). Subjectively speaking: English primary teachers' careers. *International Journal of Educational Research, 13*, 391-402.

Nisbet, R., & Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgement*. Englewood Cliffs, NJ: Prentice-Hall.

Novak, D., & Knowles, J. (1992). *Life histories and the transition to teaching as a second career.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Nussbaum, J. (1989). Classroom conceptual change: Philosophical perspectives. *International Journal of Science Education, 11*(5), 530-540.

Okley, A. (1994). Thinking through fieldwork. In A. Bryman & R. G. Burgess (Eds.), *Analyzing qualitative data* (pp. 18-43). London: Routledge.

Oppenheim, A. N. (1966). *Questionnaire Design and Attitude Measurement.* London: Pinter Publications.

Oppenheim, A. N. (1992). *Questionnaire Design and Attitude Measurement* (2nd ed.). London: Pinter Publications.

Osgood, G. E. (1969a). The nature and measurement of meaning. In J. G. Snider & C. E. Osgood (Eds.), *Semantic differential technique* (pp. 3-41). Chicago: Aldine.

Osgood, G. E. (1969b). Semantic differential technique in the comparative study of cultures. In J. G. Snider & C. E. Osgood (Eds.), *Semantic differential technique* (pp. 303-334). Chicago: Aldine.

Osgood, G. E., & Suci, G. J. (1969). Factor analysis of meaning. In J. G. Snider & C. E. Osgood (Eds.), *Semantic differential technique* (pp. 42-55). Chicago: Aldine.

Osgood, G. E., Suci, G. J., & Tannenbaum, A. J. (1969). The measurement of meaning. In J. G. Snider & C. E. Osgood (Eds.), *Semantic differential technique* (pp. 56-82). Chicago: Aldine.

Osgood, G. E., Suci, G. J., & Tannenbaum, P. H. (1957). *The measurement of meaning.* Urbana: University of Illinois Press.

Ostrom, T. M. (1968). The relationship between the affective, behavioural, and cognitive components of attitude. *Journal of Experimental Social Psychology, 5*, 12-30.

Ostrom, T. M. (1969). The relationship between the affective behavioral and cognitive components of attitude. *Journal of Experimental Social Psychology, 5*, 12-30.

Pajares, M. F. (1992). Teachers' beliefs and educational research: cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-332.

Palincsar, A. S. (1998). Social constructivism perspectives on teaching and learning. *Annual Reviews of Psychology, 49*, 345-375.

Palincsar, A. S., & Brown, A. (1984). Reciprocal teaching of comprehension fostering and monitoring activities. *Cognition and Instruction, 1*, 117-175.

Pallant, J. (2001). *SPSS survival manual: A step by step guide to data analysis using SPSS for windows*. Chicago, Illinois: Open University Press.

Paris, S. G., Wasik, B. A., & Turner, J. C. (1991). The development of strategic readers. In R. Barr & e. al. (Eds.), *Handbook of reading research* (pp. 609-640). New York: Longman.

Parker, J. C. (1984). *The preliminary investigation of the validity and reliability of the Parker Cognitive Development Inventory.* Unpublished doctoral dissertation, University of Iowa, Iowa.

Pascarella, E. T., & Terenzini, P. T. (1991). *How college affect students: Findings and insights from twenty years of research.* San Francisco, Calif: Jossey-Bass.

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students. A third decade of research* (Vol. 2). San Francisco, Calif.: Jossey-Bass.

Patrick, H. (1997). Social self-regulation: Exploring the relations between children's social relationships, academic self-regulation, and school performance. *Educational Psychologist, 32*, 209-220.

Patrick, H., & Pintrich, P. R. (2001). Conceptual change in teachers' intuitive conceptions of learning, motivation and instruction: The role of motivational and epistemological beliefs. In B. Troff & R. Sternberg (Eds.), *Understanding and teaching the intuitive mind: Student and teacher learning* (pp. 117-144). London: Lawrence Erlbaum Associates.

Pelletier, J. (1994). *Children's understanding of school and teachers' beliefs and practices in Frensh immersion and regular English language kindergarten.* Unpublished doctoral dissertation, University of Toronto, Toronto.

Pepper, S. C. (1942). *World hypotheses.* Berkeley: University of California Press.

Perkins, D. N. (1994). *The intelligent eye: Learning to think by looking at art.* Santa Monica: Getty Centre for Education in the Arts.

Perkins, D. N. (1999). The many faces of constructivism. *Educational Leadership, 57*(3), 6-11.

Perkins, D. N. (2002). *Mindware and the metacurriculum.* Retrieved 20th, September, 2006, from http://www.newhorizons.org/future/Creating_the_Future/crfut_perkins.html

Perloff, R. M. (2003). *The Dynamics of persuasion: Communication and attitudes in the 21st century.* New Jersey: Lawrence Erlbaum Associates.

Perry, B., Donovan, M. R., Kelsey, L. J., Paterson, J., Statkiewicz, W., & Allan, R. D. (1986). Two schemes of intellectual development: A comparison of development as defined by William Perry and Jean Piaget. *Journal of Research in Science Teaching, 23*(1), 73-83.

Perry, W. (1970). *Forms of intellectual and ethical development in the college years: A scheme* (1st ed.). New York: Holt, Rinehart and Winston.

Perry, W. (1978). Comments on chapter 2. In C. A. Parker (Ed.), *Encouraging development in college students*. Minneapolis, MN: University of Minnesota.

Perry, W. (1981). Cognitive and Ethical Growth: The Making of Meaning. In A. W. Chickering & Associates. (Eds.), *The modern American college* (pp. 76-116). San Francisco: Jossey-Bass.

Perry, W. (1999). *Forms of intellectual and ethical development in the college years: A scheme* (Reprinted ed.). New York: Holt, Rinehart and Winston.

Pervin, L. A. (1968). Performance and satisfaction as a function of individual- environment fit. *Psychological Bulletin, 69*, 56-68.

Peterman, F. P. (1991). *An experienced teacher's emerging constructivist beliefs about teaching and learning.* Paper presented at the annual Meeting of the American Educational Research Association, Chicago.

Peterson, P. L., Fennema, E., & Carpenter, T. P. (1991). Teachers' knowledge of students' mathematics problem-solving knowledge. In J. Brophy (Ed.), *Advances in research on teaching* (Vol. 2, pp. 49-86). Greenwick, CT: JAI.

Piaget, J. (1960). The general problems of the psychobiological development of the child. In J. M. Tanner & B. Inhelder (Eds.), *Discussions on child development: Proceedings of the world health organization study group on the psychobiological development of the child* (Vol. IV, pp. 3-27). New York: International Universities Press.

Piaget, J. (1964). *Judgment and reasoning in the child.* Totowa, NJ: Littlefield, Adams.

Piaget, J., & Inhelder, B. (1969). *The psychology of the child.* New York: Basic Books.

Pinar, W. (1986). *Autobiography and the architecture of self.* Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.

Pintrich, P. R. (1990). Implications of psychological research on student learning and college teaching for teacher education. In W. R. Houston (Ed.), *Handbook of research on teacher education* (pp. 826-857). New York: Macmillan.

Pintrich, P. R. (2002). Future challenges and directions for theory and research on personal epistemology. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 389-414). Mahwah, N.J.; London: L. Erlbaum Associates.

Piper, T. D., & Rodgers, R. F. (1992). Theory-practice congruence: Factors influencing the internalization of theory. *Journal of College Student Development, 33*(2), 117-123.

Poland, B. D. (1995). Transcription quality as an aspect of rigour in qualitative research. *Qualitative Inquiry, 1*(3), 290-310.

Ponterotto, J. G., & Grieger, I. (1999). Merging qualitative and quantitative perspectives in a research identity. In M. Kopala & L. A. Suzuki (Eds.), *Using qualitative methods in psychology* (pp. 49-62). Thousand Oaks, CA: Sage.

Posner, G. J., Strike, K. A., Hewson, P. W., & Gertzog, W. A. (1982). Accomodation of a scientific conception: Toward a theory of conceptual change. *Science Education, 66*, 211-227.

Powell, R., & Birrell, J. (1992). *The influence of prior experiences on pedagogical constructs of traditional and non traditional preservice teachers.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Powney, J., & Watts, M. (1987). *Interviewing in educational research.* London: Routledge & Kegan Paul.

Pratt, D. A. (1998). *Five perspectives on teaching in adult and higher education.* Malabar, FL: Krieger Publishing.

Prawat, R. S. (1992a). Are changes in views about mathematics teaching sufficient? The case of a fifth-grade teacher. *The Elementary School Journal, 93*(2), 195-211.

Prawat, R. S. (1992b). Teachers' beliefs about teaching and learning: A constructivist perspective. *American Journal of Education, 100*(3), 354-395.

Prawat, R. S. (1996). Constructivism, Modern and Postmodern. *Educational Psychologist, 31*(3/4), 215-225.

Prawat, R. S., & Floden, R. E. (1994). Philosophical perspectives on constructivist views of learning. *Educational Psychology, 29*(1), 37-48.

Pressley, M., Harris, K. R., & Marks, M. B. (1992). But good strategy instructors are constructivist! *Educational Psychology Review, 4*, 354-395.

Qian, G., & Alvermann, D. (1995). Role of epistemological beliefs and leaned helplessness in secondary school students' learning science concepts from text. *Journal of Educational Psychology, 87*(282-292).

Qian, G., & Pan, J. (2002). A comparison of epistemological beliefs and learning from science text between American and Chinese high school students. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 365-386). Mahwah, N.J.; London: L. Erlbaum Associates.

Rasch, G. (1960). *Probabilistic models for some intelligence and attainment tests.* Copenhagen: Danish Institute of Educational Research.

Raths, J. (2001). Teachers' beliefs and teaching beliefs. *Early Childhood Research and Practice, 3*(1).

Redhead, M. (1994). The nature of reality. In J. Worrall (Ed.), *The ontology of science* (pp. 295-307). Brookfield, VT: Dartmouth.

Reid, N. (1978). *Attitude development through a science curriculum.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Reid, N. (2003). *Getting started in pedagogical research in the physical sciences.* Hull, UK: LTSN Physical Sciences Centre.

Reid, N. (2006a). Personal Communication.

Reid, N. (2006b). Thoughts on attitude measurement. *Research in Science and Technological Education, 24*(1), 3-27.

Reid, N., & Skryabina, E. A. (2002). Attitudes towards physics. *Research in Science and Technological Education, 20*(1), 67-81.

Reid, N., & Skryabina, E. A. (2003). Gender and physics. *International Journal of Science Research, 25*(4), 509-536.

Reinsmith, W. (1992). *Archetypal forms of teaching.* Westport, CT: Greenwood Press.

Rest, J. R. (1975). *Development in judging moral issues.* Minneapolis: University of Minnesota Press.

Rhine, R. J. (1985). A concept formation approach to attitude acquisition. *Psychology Review, 65*, 362-370.

Richards, L., & Richards, T. (1994). From filing cabinet to computer. In A. Bryman & R. G. Burgess (Eds.), *Analyzing qualitative data* (pp. 147-172). London: Routledge.

Richards, T., & Richards, L. (1995). Using hierarchical categories in qualitative data analysis. In U. Kelle (Ed.), *Computer-aided qualitative analysis* (pp. 80-218). London: Sage.

Richardson, V. (1990). Significant and worthwhile change in teaching practice. *Educational Researcher, 19*(4), 10-18.

Richardson, V. (1996). The role of attitudes and beliefs in learning to teach. In J. Sikula, T. J. Buttery & E. Guyton (Eds.), *Handbook of research on teacher education : a project of the Association of Teacher Educators* (2nd ed., pp. 102-119). London: Prentice Hall International.

Richardson, V. (1998). *How teachers change*. Retrieved 28th October, 2006, from http://www.iu13.org/ipq/richards.pdf

Richardson, V., Anders, P., Tidwell, D., & Lloyd, C. (1991). The relationship between teachers' beliefs and practices in reading comprehension instruction. *American Educational Research Journal, 28*(3), 559-586.

Rickwood, T. R. (1984). *Comparative evaluation of different methods for the assessment of attitude to science.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Robson, C. (1994). *Real world research.* Oxford: Blackwell.

Rodgers, R. F. (1980). Theories underlying student development. In D. G. Creamer (Ed.), *Student development in higher education: Theories, practices, future directions.* Cincinnati, Ohio: ACPA Media.

Rodgers, R. F. (1989). Student development. In U. Delworth, G. Hanson & Associates (Eds.), *Student services: A handbook for the profession.* San Francisco: Jossey-Bass.

Rodgers, R. F. (1990). Recent theories and research underlying student development. In D. G. D. G. Creamer (Ed.), *College student development: Theory and practice for the 1990s (ACPA Media Publication No. 49, pp. 27-79).* Alexandria, VA: American College Personnel Association.

Roehler, L., & Duffy, G. (1991). *Elementary teachers' beliefs about reading and knowledge of reading content: Relationships to decisions about reading outcomes.* Eric Document Reproduction Service No. ED 285162.

Rogoff, B. (1995). Observing sociocultural activity on three planes: participatory appropriation, guided participation, and apprenticeship. In P. Wertsch, P. Del Rio & A. Alvarez (Eds.), *Sociocultural studies of mind* (pp. 139-164). Cambridge: Cambridge University Press.

Rokeach, M. (1968). *Beliefs, attitudes, and values: A theory of organization and change*. San Francisco: Jossey-Bass.

Rosenberg, M. J., & Hovland, C. I. (1960). 'Cognitive, affective, and behavioral components of attitude'. In M. Rosenberg, C. Hovland, W. J. MaGuire, R. P. Abelson & J. W. Brehm (Eds.), *Attitude organization and change: An analysis of consistency among attitude components* (pp. 1-14). New Haven, CT: Yale University Press.

Ross, E. W. (1987). Teacher perspective development: A study of pre-service social studies teachers'. *Theory and Research in Social Education, 15*(1), 1-22.

Rossi, P. H. (1994). The wars between the quals and quants: Is a lasting peace possible? In C. S. Reichardt & S. F. Rsllis (Eds.), *Qualitative-quantitative debate: New perspectives* (pp. 23-36). San Francisco: Jossey-Bass.

Rossman, G. B., & Wilson, B. L. (1985). Numbers and words: combining quantitative and qualitative methods in a single large-scale evaluation study. *Evaluation Review*(9), 627-643.

Rotter, J. B. (1966). Generalised expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80*(1), entire issue.

Rubin, H. J., & Rubin, S. I. (2005). *Qualitative interviewing: The art of hearing data* (2nd ed.). Thousand Oaks, California: Sage.

Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during school. *American Educational Research Journal, 38*, 437-460.

Ryan, M. P. (1984a). Conceptions of prose coherence: Individual differences in epistemological standards. *Journal of Educational Psychology, 76*(6), 1126-1238.

Ryan, M. P. (1984b). Monitoring text comprehension: Individual differences in epistemological standards. *Journal of Educational Psychology, 76*(2), 249-258.

Sachs, J. (2003). *The activist teaching profession*. Buckingham: Open University Press.

Saljo, R. (1979). *Learning in the learner's perspective. I. Some Common-sense conceptions*. Gothenburg: University of Gothenburg, Department of Education.

Sanford, N. (1962). *The American college: A psychological and social interpretation of higher learning*. New York: Wiley.

Sanford, N. (1981). Foreword. In A. W. Chickering & Associates (Eds.), *The modern American college*. San Francisco: Jossey-Bass.

Scheffler, I. (1965). *Conditions of knowledge: An introduction to epistemology and education*. Glenview, IL: Scott, Foresman, and Company.

Schommer, M. (1990). Effect of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology, 82*, 498-504.

Schommer, M. (1993). Epistemological development and academic performance among secondary students. *Journal of Educational Psychology, 85*, 406-411.

Schommer, M. (1994a). An emerging conceptualization of epistemological beliefs and their role in learning. In R. Garner & P. A. Alexander (Eds.), *Beliefs about text and instruction with text* (pp. 25-40). Hillsdale, NJ: Erlbaum.

Schommer, M. (1994b). Synthesizing epistemological belief research: Tentative understandings and provocative confusions. *Educational Psychology Review, 6*(4), 293-319.

Schommer, M. (2002). An evolving theoretical Framework for an epistemological belief system. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 103-118). Mahwah, N.J.; London: L. Erlbaum Associates.

Schraw, G. (2001). Current themes and future directions in epistemological research: A commentary. *Educational Psychology Review, 13*(4), 451-464.

Schraw, G., Bendixen, L. D., & Dunkle, M. E. (2002). Development and validation of the Epistemic Belief Inventory (EBI). In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 261-276). Mahwah, N.J.; London: L. Erlbaum Associates.

Schraw, G., Dunkle, M. E., & Bendixen, L. D. (1995). Cognitive Processes in Well-Defined and Ill-Defined Problem Solving. *Applied Cognitive Psychology, 9*(6), 523-538.

Schraw, G., & Olafson, L. (2002). Teachers' epistemological world views and educational practices. *Issues in Education, 8*(2), 99-149.

Schutz, A. (1970). *On phenomenology and social relations*. Chicago: University of Chicago Press.

Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118-137). Thousand Oaks, CA: Sage.

Schwandt, T. A. (2000). Three epistemological stances for qualitative inquiry. In N. K. Denzin (Ed.), *Handbook of qualitative research* (2nd ed., pp. 189-213). Thousand Oaks, CA: Sage.

Schwandt, T. A. (2006). Opposition redirected. *International Journal of Qualitative Studies in Education*(19), 803-810.

Scott, S. M. (1998). Philosophies in action. In S. M. Scott, B. Spenser & A. M. Thomas (Eds.), *Learning for life: Canadian readings in adult education.* Toronto: Thompson.

Sechrest, L., & Sidana, S. (1995). Three epistemological stances for qualitative inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 189-214). Thousand oaks, CA: Sage.

Seidman, I. (1998). *Interviewing as qualitative research: A guide for researchers in education and the social sciences.* New York: Teachers College, Columbia University.

Seiler, L. H., & Hough, R. L. (1970). Empirical comparisons of the Thurstone and Likert techniques. In G. F. Summers (Ed.), *Attitude measurement* (pp. 159-173). Chicagoo: Rand McNally.

Selepeng, D. B. (2000). *An investigation of intellectual growth in undergraduate biology students using the Perry scheme.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Seligman, M. E. (1975). *Helplessness.* W. H. Freeman: Reading.

Senger, E. (1992). *Personalized staff development: The effect of reflective dialogue on the beliefs, values, and practices of three elementary school mathematics teachers.* Unpublished doctoral dissertation, University of Arizona, Tucson.

Serumola, L. B. (2003). *A study of scientific thinking with young adolescents.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Shadish, W. (1995). The quantitative-qualitative debates: "DeKuhnifying the conceptual context. *Evaluation and Program Planning, 18*(1), 47-49.

Shapiro, N. S. (1984). *Rhetorical maturity and Perry's model of intellectual development: Competence, context, and cognitive complexity in college students' writing (audience awareness, composition, coherence).* University of Maryland, College Park, Maryland.

Shaw, K. (1989). *Contrasts of teacher ideal and actual beliefs about mathematics understanding: Three case studies.* Unpublished doctoral dissertation, University of Georgia, Athens.

Shaw, K., & Jakubowski, E. (1991). Teachers changing for changing times. *Focus on Learning Problems in Mathematics, 13*(4), 13-20.

Shaw, M., & Wright, J. (1967). *Scales for the measurement of attitudes.* New York: McGraw-Hill.

Shipman, M. (1967a). Environmental influences on responses to questionnaires. *British Journal of Educational Psychology, 37*, 54-57.

Shipman, M. (1967b). Theory and practice in the education of teachers. *Educational Research, 9*, 208-212.

Shuell, T. J. (1996). Teaching and learning in a classroom context. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 726-764). New York: MacMillan.

Shulman, L. S. (1986a). Paradigm and research programs in the study of teaching. In M. Wittrock (Ed.), *Handbook of research on teaching* (pp. 1-36). New York: Macmillan.

Shulman, L. S. (1986b). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*, 4-14.

Sieber, S. D. (1973). The integration of fieldwork and survey methods. *American Journal of Sociology*(73), 1335-1359.

Siegel, S. (1956). *Nonparametric statistics.* Kogakusha: McGraw Hill.

Siegler, R. S. (1996). *Emerging minds: The process of change in children's thinking.* Oxford, England: Oxford University Press.

Sigel, R. (1985). A conceptual analysis of beliefs. In I. E. Sigel (Ed.), *Parental belief systems: The psychological consequences for children* (Vol. 345-371). Hillsdale, NJ: Erlbaum.

Simmons, W., & Resnick, L. (1993). Assessment as the catalyst of school reform. *Educational Leadership, 50*(5), 11-15.

Simon, H. (1969). *Sciences of the artificial.* Cambridge, MA: MIT Press.

Simon, M. A., & Mazza, W. (1993). *From learning mathematics to teaching mathematics: A case study of a prospective teacher in a reform-oriented program.* Paper

presented at the annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Monterey, CA.

Sinatra, G. M. (2001). Guest editor: Knowledge and beliefs and learning. *Educational Psychology Review, 13*(4).

Skryabina, E. A. (2000). *Students' attitudes to learning physics at school and university levels in Scotland.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Smith, C., & Sutherland, M. (2003). Creating a community of teacher-learners. *Journal of Inservice Education, 29*(3), 425-439.

Smith, J. K. (1983). Quantitative versus qualitative research: An attempt to clarify the issue. *Educational Researcher, 12*, 6-13.

Smith, J. K., & Heshusius, L. (1986). Closing down the conversation: The end of the quantitative-qualitative debate among educational enquirers. *Educational Researcher, 15*, 4-12.

Southerland, S. A., Sinatra, G. M., & Matthews, M. R. (2001). Beliefs, Knowledge and Science Education. *Educational Psychology Review, 13*(4), 325-351.

Stern, G. G. (1970). *Measuring person-environment congruence in education and industry.* New York: John Wiley and sons.

Sternberg, R. (1994). Allowing for thinking styles. *Educational Leadership, 52*(3), 36-41.

Sternberg, R. (1997). *Thinking styles.* Cambridge: Cambridge University Press.

Stewart, D. W., & Shamdasani, P. N. (1990). *Focus groups: theory and practice.* Thousand Oaks, CA: Sage.

Stipek, D. J., & Byler, P. (1997). Early childhood education teachers: Do they practice what

they preach? *Early Childhood Research Quarterly, 12*, 305–327.

Stipek, D. J., Givvin, K. B., Salmon, J. M., & MacGyvers, V. L. (2001). Teachers' beliefs and practices related to mathematics instruction. *Teaching and Teacher Education, 17*, 213–226.

Stonewater, B. B., Stonewater, J. K., & Hadley, T. D. (1986). Intellectual development using the Perry scheme: An exploratory comparison of two assessment instruments. *Journal of College Student Personnel, 27*(6).

Strauss, A. S., & Corbin, J. M. (1990). *Basic of Qualitative Research: Techniques and procedures for developing grounded theory.* Thousand Oaks, Calif: Sage.

Sugrue, C. (1997). *Complexities of teaching: Child centered perspectives.* London: The Falmer Press.

Svinicki, M. (1991). Theories and metaphors we teach by. In R. Menges & M. Svinivki (Eds.), *College teaching: From theory to practice* (Vol. 111-119). San Francisco: Jossey-Bass.

Talbert, J. (1994). Boundaries of teachers' professional communities in U.S. high schools: Power and precariousness of the subject department. In L. S. Siskin & J. W. Little (Eds.), *The high school department: Perspectives on the subject organization of secondary schools* (pp. 68-94). New York: Teachers College Press.

Tanaka, Y., Oyama, T., & Osgood, G. E. (1969). A cross-cultural and cross-concept study of the generality of semantic space. In J. G. Snider & C. E. Osgood (Eds.), *Semantic differential technique* (pp. 289-302). Chicago: Aldine.

Tasaki, K. (2001). *Culture and epistemology: An investigation of different patterns in epistemological beliefs across cultures.* Unpublished doctoral dissertation, University of Hawai'i, Ann Arbor, Manon.

Tashakkori, A., & Creswell, J. W. (2007). Editorial: The new era of mixed methods. *Journal of Mixed Methods Research, 1*(3), 3-7.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches.* Thousand Oaks, CA: Sage.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social & behavioral research.* Thousand Oaks, CA: Sage.

Tawila, S., Lloyd, C. B., Bensch, B. S., & Wassef, H. (2000). *The school environment in Egypt: A situational analysis of public preparatory schools.* Cairo: Population Council.

Taylor, K. E. (1990). *The dilemma of difference: the relationship of intellectual development to tolerance, self-esteem, and racial identity in black and white college students.* University of Maryland, College Park, MD.

Taylor, M. B. (1983). *The development of the Measure of Epistemological Reflection.* Unpublished doctoral dissertation, The Ohio State University, Columbus,OH.

Taylor, P. (1990). *The influence of teachers' beliefs on constructivist teaching practices.* Paper presented at the Annual Meeting of the American Research Association, Boston, MA.

Taylor, P., Richardson, J., Yeo, A., Marsh, I., Trobe, K., & Pilkington, A. (1995). *Sociology in focus*. Ormskirk: Causeway Press.

Teddlie, C., & Tashakkori, A. (2006). A general typology of research designs featuring mixed methods. *Research in the Schools, 13*(1), 12-28.

Terman, L. M. (1973). *Concept mastery test manual*. New York: Psychological Corporation.

Thagard, P. (1992). *Conceptual revolutions*. Princeton, NJ: Princeton University Press.

Thoma, G. A. (1993). The Perry framework and tactics for teaching critical thinking in economics. *Journal of economic education, 24*(2), 128-135.

Thompson, A. (1992). Teachers' beliefs and conceptions: A synthesis of the research. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning: A project of the national council of teachers of mathematics* (pp. 127-146). New York: Macmillan Publishing Company.

Thurstone, L. L. (1931). The measurement of social attitudes. *Journal of Abnormal and Social Psychology, 26*, 249-269.

Thurstone, L. L., & Chave, E. J. (1929). *The measurement of attitudes*. Chicago: University of Chicago Press.

Tittle, C. R., & Hill, R. J. (1967). Attitude measurement and prediction of behavior: An evaluation of conditions and measurement techniques. *Sociometry, 30*(June), 199-213.

Triandis, H. C. (1971). *Attitudes and attitude change*. London: Wiley.

Trow, M. (1957). Comment on "Partcipant observation and interviewing: A comparison". *Human Organization, 16*(3), 33-35.

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*, 202–248.

Tuckman, W. R. (1972). *Conducting educational research: An introduction*. New York: Harcourt Brace Jovanovich.

Tzuriel, D. (2000). Dynamic assessment of young children: Educational and intervention perspectives. *Educational Psychology Review, 12*(385-436).

UNESCO. (2005). *Education for All Global Monitoring Report - The Quality Imperative*. Paris: France. Retrieved at http://portal.unesco.org/education/en/ev.php-URL_ID=35939&URL_DO=DO_TOPIC&URL_SECTION=201.html.

Van Fleet, A. (1979). Learning to teach: The cultural transmission analogy. *Journal of Thought, 14*(281-290).

Vasta, R., Haith, M. M., & Miller, S. A. (1995). *Child psychology: The modern science.* New York, NY: Wiley.

Vaughn, S., Schumm, J. S., & Sinagub, J. (1996). *Focus group interviews in education and psychology.* Thousand Oaks, CA: Sage.

Vianna, J. F. (1991). *Using information processing theory to design an undergraduate practical course in chemistry.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

Von Glaserfeld, E. (1984). An introduction to radical constructivism. In P. Watzlawick (Ed.), *The invented reality* (pp. 17-40). New York: Norton.

Von Glaserfeld, E. (1992). Constructivism reconstructed: A reply to Suchting. *Science and Education, 1*, 379-384.

Vygotsky, L. S. (1962). *Thought and language.* Boston: Massachusetts Institute of Technology Press.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Wadsworth, B. J. (1979). *Piaget's theory of cognitive development* (2 ed.). New York: Longman.

Walker, P., & Entwistle, N. (1999). Conceptions of teaching and levels of understanding: Emerging structures and shifting awareness. In C. Rust (Ed.), *Improving students learning: Improving students as learners* (pp. 309-318). Oxford: Oxford Brooks University.

Warschauer, M. (2003). Dissceting the 'Digital Divide': A case study in Egypt. *The information Society*(19), 297-304.

Wasley, P. A. (1992). Working together: Teachers leadership and collaboration. In C. Livingston (Ed.), *Teachers as leaders: Evolving Roles* (pp. 159-165). Washington, D. C.: NEAS School Restructuring Series, National Education Association.

Webb, E. J., Campbell, D. T., Schwartz, R. D., & Sechrest, L. (1966). *Unobtrusive measures.* Chicago: Rand McNally.

Wells, W. D., & Smith, G. (1960). Four semantic rating scales compared. *Journal of Applied Psychology, 44*, 393-397.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity.* Cambridge: Cambridge University Press.

West, E. J. (1996). *College students' ways of thinking about science.* Unpublished Master's thesis, Cornell University, Ithaca, NY.

West, E. J. (2004). Perry's legacy: Models of epistemological development. *Journal of adult development, 11*(2), 61-70.

Wheatley, G. H. (1991). Constructivist perspectives on science and mathematics learning. *Science and Education, 75*, 9-21.

Wheatley, M. (1999). *Leadership and the new science: Discovering order in a chaotic world* (2nd ed.). San Francisco, CA: Berrett-Koehler Publishers.

White, B. C. (2000). Pre-service teachers' epistemology viewed through perspectives on problematic classroom situations. *Journal of Education for Teaching, 26*, 279-305.

White, R. W. (1999). Foreword. In W. Perry (Ed.), *Forms of intellectual and ethical development in the college years: A scheme* (pp. xxxix-xii). New York: Holt, Rinehart and Winston.

Whitehead, R. (2006). Personal Communication.

Widick, C. (1975). *An evaluation of developmental instruction in a university setting.* Dissertation Abstract International, 36, 2041A.

Widick, C. (1977). The Perry Scheme: A foundation for developmental practice. *Councelling Psychologist, 6*(4), 35-38.

Widick, C., Knefelkamp, L., & Parker, C. A. (1987). Student Development. In U. Delworth, G. Hanson & Associates (Eds.), *Student Services: A handbook for the profession.* San Farncisco: Jossey-Bass.

Wiersma, M. C. (2000). *Research methods in education: An introduction* (7th ed.). Boston: Allyn & Bacon.

Wilber, K. (1995). *Sex, ecology, spirituality: The spirit of evolution.* Boston: Chambhala Publications, Inc.

Windschitl, M. (1990). The challenge of sustaining a constructivist culture. *Phi Delta Kappan, November*, 204-209.

Witkin, H. (1962). *Psychological differentiation.* New York: Wiley.

Wolcott, H. F. (1990). *Writing up qualitative research.* Newbury Park, CA: Sage.

Wood, D. (1996). *Teacher cognition in language teaching beliefs, decision-making and classroom Practice*. Cambridge: Cambridge University Press.

Wood, P. K., & Kardash, C. (2002). Critical elements in the design and analysis of studies of epistemology. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 231-260). Mahwah, N.J.; London: L. Erlbaum Associates.

Woodbury, S. (Submitted). Teacher change in the context of mathematics educational reform: A conceptual change model. *Curriculum Inquiry*.

Wright, B. (1958). *A semantic differential and how to use it*. Chicago: Social Research, Inc. (mimeographed).

Yackel, E., & Cobb, P. (1996). Sociomathematical norms, argumentation, and autonomy in mathematics. *Journal of Research in Mathematics Education, 27*, 458-477.

Yerrick, R., Parke, H., & Nugent, J. (1997). Struggling to promote deeply rooted change: The filtering effect of teachers' beliefs on understanding transformational views of teaching science. *Science Education, 81*(2), 137-159.

Zaalouk, M. (2006). *Pre-University Educational Reform In Egypt*. Retrieved 4th October, 2006, from http://weekly.ahram.org.eg/2006/813/sc151.htm

Zammito, J. (2004). *A nice derangement of epistemes: Post-positivism in the study of science from Quine to Latour*. Chicago: University of Chicago Press.

Zeichner, K., & Gore, J. (1990). Teacher socialization. In W. R. Houston (Ed.), *Handbook of research on teacher education* (pp. 329-348). New York: Macmillan.

Zeichner, K., Tabachnick, B. R., & Densmore, K. (1987). Individual, institutional, and cultural influences on the development of teachers' craft knowledge. In J. Calderhead (Ed.), *Exploring teachers' thinking* (pp. 21-59). London: Cassell.

Zeichner, K., & Tabachnick, R. (1981). Are the effects of university teacher education 'washed out' by school experience? *Journal of Teacher Education, 32*(3), 7-11.

Zhang, L. (1995). *The constructions of a Chinese language cognitive developmental inventory and its use in a cross-cultural study of the Perry scheme*. University of Iowa, Iowa.

Zhang, L. (1999). A comparison of U.S. and Chinese university students' cognitive development: the cross-cultural applicability of Perry's theory. *Journal of Psychology, 133*(4), 425-439.

Zhang, L. (2004a). Do university students' thinking styles matters in their preferred teaching approaches. *Personality and Individual Differences, 37*, 1151-1564.

Zhang, L. (2004b). The Perry scheme: across approaches to the study of human psychology. *Journal of adult development, 11*(2), 123-138.

Zhang, L. (2004c). Thinking styles: University students' preferred teaching styles and their conceptions of effective teachers. *Journal of Psychology, 138*(3), 233-252.

Zinn, L. (1991). Identifying your philosophical orientation. In M. W. Galbraith (Ed.), *Adult learning methods: A guide to effective instruction* (Revised ed., pp. 39-77). Malabar, FL: Krieger.

Zinn, L. (1999). *Philosophy of adult education inventory* (Revised ed.). Boulder, CO: Lifelong learning Options.

Appendices

An Outline of the Structure of the Egyptian Educational System

Egypt operates two parallel educational systems: the secular or the State system and the religious or the Azharite system. The secular system – which formed the context of this study – is organised into four stages. These are:

- Pre-school education
- Basic Education (Arabic: *Marhalet El-Taaleem Al-Asassi*) including both the primary stage and the preparatory stage.
- Secondary Education (Arabic: *Marhalet El-Taaleem Al-Thanawi*).
- Post-Secondary Education.

The first level of pre-school education comes prior to basic education for children aged 4 to 6 years old. The second level known as basic education covers the first 9 years of state-sponsored schooling. Primary education used to be six years. In 1988, it was reduced to five years. However, in 1999, primary education years were restored to six years again. Whereas primary education covers ages from six to twelve, preparatory education deals with students till the age of fifteen[1].

The third level of secondary education divides students between three-year general academic secondary schools and three or five vocational or technical schools (i.e. commercial, agricultural, or industrial). The schools approached in this study were from the first stream. This stream of secondary education has been subjected to recent reform. Currently, forthcoming additional changes are being considered as its final exam (Arabic: *thanawaya amma*) is frequently reviewed. This is basically because eligibility for admission to any higher education university or institution is solely dependent to the score students obtain on this exam[2].

The fourth level of post secondary education involves universities and institutions of technical and professional training. Depending on the field, a bachelor's degree is obtained in between three and seven years of study[3]. Preparation for teaching requires the completion of a teacher training degree that is typically four years in length[4]. Other qualifications – like for example General Certificate for Education – enable graduates from different disciplines to pursue the teaching career.

---

[1] http://www.emoe.org/

[2] http://www.gse.buffalo.educ/org/InHigherEdFinance/Egypt.pdf

[3] http://www.egy-mhe.gov.eg

[4] http://www.ed.gov/offices/OUS/PES/int_egypt.html

An Outline of the Structure of the Scottish Educational System

Scottish educational provision is dominated by four large sectors: primary schooling, secondary schooling, further education colleges and higher education institutions. Alongside these main areas of activity are pre-school education, special education and community education (Bryce & Humes, 1999).

Primary education starts when children are four-and-a-half or five years of age. Pupils remain at primary school for seven years completing Primary One to Seven. Then, aged eleven or twelve, pupils start their secondary schooling for a compulsory four years with the final two years being optional. Sixteen is the school leaving age which normally occurs after completing the Standard Grade examination (usually completed in the last year of compulsory education). If students choose to remain at school, they will be able to sit Intermediate 1, Intermediate 2 or Higher exams in their fifth year of Secondary education (S5). During the sixth year (S6), students typically study Advanced Higher and/or Higher courses in a wide range of subjects. Higher and/or Advanced Higher qualifications are held essential for entry to university.

After leaving school, pupils can choose to continue their education either by entry to a further or higher education institution. Further education largely provides vocational education and training.

To become a registered teacher, a teacher qualification must be obtained. Such qualifications include, but are not limited to, the Postgraduate Certificate in Education (PGCE), Professional Graduate Diploma in Education (PGDE) and the Bachelor of Education[1] All newly qualified teachers in Scotland are provisionally registered with the General Teaching Council (GTC) Scotland and are entitled to a one year probationary period. Following successful completion of the probationary period, full registration with the GTC is obtained. All teachers working in Scotland must hold provisional or full registration with the GTC before being allowed to teach.

[1] Wikipedia. Retrieved 16th November, 2006, from http://en.wikipedia.org/wiki/Scottish_education

Components from Existing Models of Epistemological Beliefs and Thinking

Researcher(s)	Core Dimensions of Epistemological Theories		Peripheral Beliefs about Learning, Instruction, and Intelligence	
	Nature of knowledge	**Nature of knowing**	**Nature of learning and instruction**	**Nature of intelligence**
Perry	*Certainty of Knowledge:* Absolute ←→ Contextual Relativism	*Source of knowledge* Authorities ←→ Self		
Belenky et al.		*Source of knowledge* Received ←→ Constructed Outside the self ←→ Self as maker of meaning		
Baxter Magolda	*Certainty of Knowledge:* Absolute Contextual	*Justification for knowing:* Received or mastery ←→ Evidence judged in context *Source of knowledge:* Reliance on authority ←→ Self	Role of learner Evaluation of learning Role of peers Role of instructor	

King & Kitchener	*Certainty of knowledge:* Certain, right/wrong Uncertain, contextual *Simplicity of Knowledge:* Simple ←→ Complex	*Justification for knowing:* Knowledge requires no justification ←→ Knowledge is constructed, and judgments are critically re-evaluated *Source of knowledge:* Reliance on authority ←→ Knower as constructor of meaning		
Kuhn	*Certainty of knowledge:* Absolute, right/wrong answers ←→ Knowledge evaluated on relative merits	*Justification of knowing:* Acceptance of facts, unexamined expertise←→ Evaluation of Expertise *Source of knowledge:* Experts ←→ Experts critically evaluated		
Schommer	*Certainty of knowledge:* Absolute ←→ Tentative and evolving *Simplicity of knowledge:* Isolated, unambiguous bits ←→ Interrelated concepts	*Source of knowledge:* Handed down from authority ←→ Derived from reason	Quick learning	Innate ability

Extracted from Hofer & Pintrich (1997)

Pajares'[1] Synthesis of the Literature Review on Beliefs

- Beliefs are formed early and tend to self-perpetuate, persevering even against contradiction caused by reason, time, schooling, or experience.
- Individuals develop a belief system that houses all the beliefs acquired through the process of cultural transmission.
- The belief system has an adaptive function in helping individuals define and understand the world and themselves.
- Knowledge and beliefs are inextricably intertwined, but the potent affective, evaluative, and episodic nature of beliefs makes them a filter through which new phenomenon are interpreted.
- Thought processes may well be precursors to and creators of beliefs, but the filtering effect of belief structures ultimately screens, redefines, distorts, or reshapes subsequent thinking and information processing.
- Epistemological beliefs play a key role in knowledge interpretation and cognitive monitoring.
- Beliefs are prioritized according to their connections or relationship to other beliefs or other cognitive and affective structures. Apparent inconsistencies may be explained by exploring the functional connections and centrality of the beliefs.
- Belief substructures, such as educational beliefs, must be understood in terms of their connections not only to each other but also to other, perhaps more central, beliefs in the system. Psychologists usually refer to these substructures as attitudes and values.
- By their very nature and origin, some beliefs are more incontrovertible than others.
- The earlier a belief is incorporated into the belief structure, the more difficult it is to alter. Newly acquired beliefs are most vulnerable to change.
- Belief change during adulthood is a relatively rare phenomenon, the most common cause being a conversion from one authority to another or a gestalt shift. Individuals tend to hold on to beliefs based on incorrect or incomplete knowledge even after scientifically correct explanations are presented to them.
- Beliefs are instrumental in defining tasks and selecting the cognitive tools with which to interpret, plan, and make decisions regarding such tasks; hence, they play a critical role in defining behaviour and organizing knowledge and information.

[1] Pajares, M. F. (1992). Teachers' beliefs and educational research: cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332.

- Beliefs strongly influence perception, but they can be an unreliable guide to the nature of reality.
- Individuals' beliefs strongly affect their behaviour.
- Beliefs must be inferred and this inference must take into account the congruence among individuals' belief statements, the intentionality to behave in a predisposed manner, and the behavior related to the belief in question.
- Beliefs about teaching are well established by the time a student gets to college.

(Pajares, 1992, p. 324)

Comparison of the Various Models of Epistemological Beliefs and Thinking

Perry

Dualism		Multiplicity		Relativism	Commitment in Relativism			
1	2	3	4a	5	6	7	8	9
			4b					

Denotes distinction from other theories

Baxter Magolda

Absolute	Transitional	Independent	Contextual
Mastery	Impersonal	Individual	
Receiving	Interpersonal	Interindividual	

Belenky, Clinchy, Goldberger, and Tarule

Received	Subjective	Procedural	Constructed
		Separate	
		Connected	

Silence

King and Kitchener

Pre-Reflective			Quasi-Reflective		Reflective	
1	2	3	4	5	6	7

Teaching and Learning

(Student's Version)

This survey seeks to find your views about some aspects of the complex process of teaching and learning

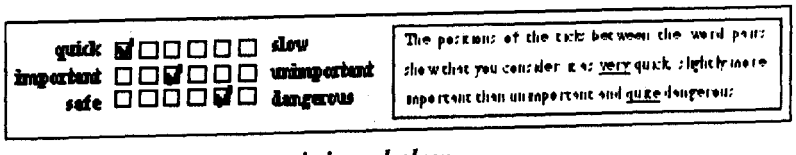
Name: .....*(Optional)* Matriculation Number: .....*(Optional)*

Sex: Male ☐ Female ☐

Years of study BEd: 1 ☐ 2 ☐ 3 ☐ 4 ☐

PGCE: Primary ☐ Secondary ☐

(A) Here is a way to describe a racing car:



Use the same approach to show your opinions below.

Tick ONE box on each line

1	In exams, my job is to answer the questions using information I have been taught as well as information I have gained for myself.							In exams, my job is to give back the information provided on the course as accurately as possible.
2	All one has to do in studying is to memorize things paying great attention to the details.							Instead of just memorizing things, it is more interesting to look for patterns and relationships among information and facts, searching for the big idea behind it all.
3	If you are intelligent, you will be able to do many things well.							Intelligence means different things. This means that you can be good at one thing and bad at another.
4	I prefer questions which require short answers and are based on the course.							I find short answer questions restrictive, as they don't give me the opportunity to go beyond what is taught and show my ability to think.
5	I think a good lecturer should point out some of the conflicting views on an issue. Students should be given the opportunity to weigh them up.							A good lecturer is the one who points out to students the one accepted view on an issue or at least his preferred one.
6	Knowledge is complex and by no means all black and white. I find this exciting and stimulating. It makes me want to explore things more for myself.							Knowledge is a collection of facts that are right or wrong, black or white. I dislike uncertainties and vague statements.
7	To me being assessed is not a real threat. It is an opportunity for feedback and improvement of learning and teaching.							Feedback is not of much importance as getting high grades if not the best grades. It is the most important aspect of my assessment.
8	Intelligence is something like a muscle that can - given the right circumstances - develop or shrink							Intelligence is something genetic that you're born with. You can learn new things but you can't change it
9	The best way to pass my courses, I believe is to study just what the lecturer tells me.							I don't have to rely totally on the lecturer. Part of my learning is to work things out myself.
10	Students should take some responsibility and have a say in deciding what to learn, how to learn and how to be assessed.							Lecturers are experts in their subjects. If things at times look confusing, it is so because they want us to think for ourselves.
11	I think a good lecturer should avoid teaching materials that they know students will find difficult.							Lecturer should aim at providing challenges to their students by introducing difficult topics.
12	I believe in exams what matters is the quality of my answers, not how much information I provide.							In exams, I expect to be rewarded for giving as much information as possible.

13	Students should be given the chance to pursue their own interests in class.							If students are given the chance to pursue their interests in the class, we might end up not learning enough of the course.
14	I don't believe that all we learn represents the 'absolute truth'; students should try to understand arguments for and against the existing knowledge.							What we learn outlines a set of explanations about what is happening in the world. Students need to confine themselves to absorbing this information.
15	I like it when students disagree. I understand more as a result of these discussions.							I don't like it when students disagree. Disagreement means no one understands what is being discussed.
16	I can't be wrong if I accept what the lecturer says. If I question anything I might end up failing.							I don't believe in just accepting what the lecturer says without question. Success involves thinking for myself.
17	I don't like vague assignment where the lecturer does not specify exactly what is required from you and how to get it done.							I enjoy undertaking tasks where the lecturer does not specify exactly what to be done and it is left to me to decide.
18	Intelligent students have high IQ and do well at university.							Intelligence is not limited to IQ scores or to academic success.

(B) For each of the following questions, tick one box which best reflects your opinion.

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
(1)	The ideal lecturer can tell who is able and who is not.	☐	☐	☐	☐	☐
(2)	When I start a new course, the most important aspect is knowing the assessment procedures.	☐	☐	☐	☐	☐
(3)	Perplexing as it may sometimes appear, I find my lecturers different points of view very interesting and stimulating.	☐	☐	☐	☐	☐
(4)	I find working in groups a good opportunity to discuss things with my peers and to listen to their viewpoints. However, I consider the final word of the lecturer to be much more important.	☐	☐	☐	☐	☐
(5)	If lecturers would stick to the information and the facts they are teaching and do less theorizing, one could get more out of their classes.	☐	☐	☐	☐	☐
(6)	My peers and I can be just as reliable a source of assessment as the teachers.	☐	☐	☐	☐	☐
(7)	The information the lecturer gives or that is in the textbooks is far more important than any class activities which require thinking about what we already know or what we have learned.	☐	☐	☐	☐	☐
(8)	In learning, I don't like to encounter information which contradicts what I already know.	☐	☐	☐	☐	☐
(9)	The views of my peers could sometimes sound more important, critical and worth some thought than those of the lecturer or those in the textbooks.	☐	☐	☐	☐	☐

YOUR COMMENTS

I am willing to share in a follow up interview: Yes ☐ No ☐

Contact email: .....

Thank you very much for your cooperation

Centre for Science Education
University of Glasgow

Teaching and Learning

(Teacher's Version)

This survey seeks to find your views about some aspects of the complex process of teaching and learning

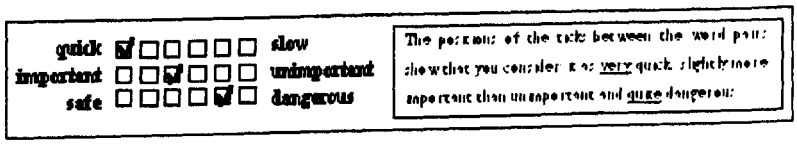
Name: .....*(Optional)* School Name: ..... *(Optional)*

Sex: Male ☐ Female ☐

Level of Teaching: Primary ☐ Secondary ☐ Other ☐

How long (in years) have you been teaching? 1-5 ☐ 6-10 ☐ 11-15 ☐ too long! ☐

(A) Here is a way to describe a racing car:



Use the same approach to show your opinions below.

Tick <u>ONE</u> box on each line

1	In exams, my students' job is to answer the questions using information I have taught as well as information they have gained for themselves.							In exams, my students' job is to give back the information provided on the course as accurately as possible.
2	All students have to do in studying is to memorize things paying great attention to the details.							Instead of just memorizing things, students should look for patterns and relationships among information and facts, searching for the big idea behind it all.
3	If you are intelligent, you will be able to do many things well.							Intelligence means different things. This means that you can be good at one thing and bad at another.
4	I prefer to base my exams on questions which require short answers and are based on the course.							I find short answer questions restrictive, as they don't give my students the opportunity to go beyond what is taught and show their ability to think.
5	I think a good teacher should point out some of the conflicting views on an issue. Students should be given the opportunity to weigh them up.							A good teacher is the one who points out to students the one accepted view on an issue or at least his preferred one.
6	Knowledge is complex and by no means all black and white. I find this exciting and stimulating. It makes me want to explore things more for myself.							Knowledge is a collection of facts that are right or wrong, black or white. I dislike uncertainties and vague statements.
7	Assessment to my students is not a real threat. It is an opportunity for feedback and improvement of learning and teaching.							Feedback is not of much importance as getting high grades if not the best grades. It is the most important aspect of students' assessment.
8	Intelligence is something like a muscle that can - given the right circumstances - develop or shrink							Intelligence is something genetic that you're born with. You can learn new things but you can't change it
9	The best way for my students to pass any course, I believe is to study just what the teacher tells them.							Students don't have to rely totally on the teacher. Part of their learning is to work things out themselves.
10	Students should take some responsibility and have a say in deciding what to learn, how to learn and how to be assessed.							Teachers are experts in their subjects. Instructional decisions are their prime responsibility.
11	I think a good teacher should avoid teaching materials that they know students will find difficult.							Teachers should aim at providing challenges to their students by introducing difficult topics.
12	I believe in exams what matters is the quality of students' answers, not how much information they provide.							In exams, students expect to be rewarded for giving as much information as possible.
13	Students should be given the chance to pursue their own interests in class.							If students are given the chance to pursue their interests in the class, students might end up not learning enough of the course.

14	I don't believe that all we teach represents the 'absolute truth'; students should try to understand arguments for and against the existing knowledge.							What we teach outlines a set of explanations about what is happening in the world. Students need to confine themselves to absorbing this information.
15	I like it when students disagree. I believe my students understand more as a result of these discussions.							I don't like it when students disagree. Disagreement means no one understands what is being discussed.
16	Students can't be wrong if they accept what the teacher says. If they question anything, they might end up failing.							I don't believe in students just accepting what the teacher says without question. Success involves thinking for themselves.
17	I don't like giving vague assignment where I do not specify exactly what is required from my students and how to get it done.							I enjoy giving tasks where I specify exactly what to be done and it is left to my students to decide
18	Intelligent students have high IQ and do well at school.							Intelligence is not limited to IQ scores or to school success.

(B) For each of the following questions, tick one box which best reflects your opinion.

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
(1)	The ideal teacher can tell who is able and who is not.	☐	☐	☐	☐	☐
(2)	When I start a new course, the most important aspect is letting my students know the assessment procedures.	☐	☐	☐	☐	☐
(3)	Perplexing as it may sometimes appear, I find different points of view I encounter very interesting and stimulating.	☐	☐	☐	☐	☐
(4)	I find working in groups a good opportunity for my students to discuss things together and to listen to different viewpoints. However, I consider the final word of the textbook to be much more important.	☐	☐	☐	☐	☐
(5)	If teachers would stick to the information and the facts they are teaching and do less theorizing, students could get more out of their classes.	☐	☐	☐	☐	☐
(6)	Students can be just as reliable a source of assessment as the teacher.	☐	☐	☐	☐	☐
(7)	The information the teacher gives or that is in the textbooks is far more important than any class activities which require thinking about what students already know or what they have learned.	☐	☐	☐	☐	☐
(8)	I find it confusing to encounter information which contradicts what I already know.	☐	☐	☐	☐	☐
(9)	The views of my students could sometimes sound more important, critical and worth some thought than those of my colleagues or those in the textbooks.	☐	☐	☐	☐	☐

YOUR COMMENTS

I am willing to share in a follow up interview: Yes ☐ No ☐

Contact email: .....

Thank you very much for your cooperation

Centre for Science Education

University of Glasgow

التعليم و التعلم
(نسخة الطالب)

الاستبيان الذي بين يديك هو جزء من دراسة تهدف التعرف علي وجهات نظرك عن عملية التعليم و التعلم، وتجدر الإشارة هنا إلي أن إجاباتك سوف تعامل بسرية تامة ولن تستخدم إلا لأغراض البحث العلمي ولن تؤثر علي نتيجتك في الكلية.

الكلية: ..... الإسم: .....
(اختياري)

الجنس: ذكر ☐ أنثى ☐

الفرقة: الأولي ☐ الثانية ☐ الثالثة ☐ الرابعة ☐

الشعبة: تربوي ☐ عام ☐

الدبلوم: الخاص ☐ العام ☐

الجزء الأول: سيتم في السؤال القادم عرض أزواج من العبارات مع وجود ستة صناديق بينها، يمكنك عن طريق وضع (√) في **أحد** هذه الصناديق الستة أن توضح مع أي عبارة تتفق و إلي أي مدي تتفق معها، وذلك كما في المثال التالي:

تدل العلامات الموجودة على أنك تعتقد أن عربة السباق سريعة جدا جدا، وبالرغم من أنها ليست على درجة كبيرة من الأهمية إلا أنك تعتبرها مهمة عن كونها غير مهمة، وكذلك أنها خطيرة بدرجة كبيرة.

بطيئة	☐	☐	☐	☐	☐	☐	☑	سريعة
غير مهمة	☐	☐	☐	☐	☑	☐	☐	مهمة
خطيرة	☐	☑	☐	☐	☐	☐	☐	امنة

الآن ضع علامة (√) في الصندوق الذي يمثل وجهه نظرك مع مراعاة وضع <u>علامة واحدة فقط</u> لكل سؤال:

1	مهمتي في الامتحان هي إجابة الأسئلة مستعينة بالمعلومات التي درستها بالإضافة إلي تلك التي اكتسبتها من خلال قراءاتي.							مهمتي في الامتحان هي استرجاع المعلومات التي درستها في أي مادة مراعية الدقة قدر المستطاع.
2	كل ما ينبغي علي عمله في المذاكرة هو حفظ الأشياء مهتما بالتفاصيل.							بدلا من الاقتصار علي الحفظ أجد انه من الممتع أن ابحث عن منظومات و علاقات بين المعلومات مهتما بالفكرة العامة وراء كل شئ.
3	إذا كنت ذكي فبإمكانك أن تفعل أشياء عديدة بكفاءة.							الذكاء يتضمن أشياء مختلفة، فقد تكون جيد في شئ و سيء في شئ أخر.
4	أفضل الأسئلة التي تتطلب إجابات قصيرة والتي تعتمد علي المقرر بشكل أساسي.							أجد الأسئلة التي تتطلب إجابات قصيرة مقيدة، فهي لا تعطيني فرصة لشرح ما اعرفه و إظهار قدرتي علي التفكير.
5	اعتقد أن المحاضر الجيد هو من يعرض بعض وجهات النظر المختلفة لأي قضية يدرسها، و علي الطالب أن يأخذ الفرصة للنقد و اختيار ما يستطيع تدعيمه بالبرهان و المنطق							المحاضر الجيد هو الذي يحدد لتلاميذه وجهة النظر المتفق عليها في أي موضوع يدرسه أو علي الأقل يحدد الرأي الذي يفضله و يحبذه هو شخصيا.
6	المعرفة معقدة وليست بأي حال ابيض أو اسود، صواب أو خطأ. أجد ذلك ممتعا وشيقا فهو يدفعني لمعرفة واكتشاف المزيد بنفسي.							المعرفة مجموعة من الحقائق التي إما ابيض أو اسود، صواب أو خطأ. لا أحب الغموض و عدم اليقين.
7	لا يمثل الامتحان بالنسبة لي موقف تهديد، اعتبره فرصة للمراجعة و تصحيح المسار و تحسين كلا من عملية التدريس و التعلم.							لا اعتبر المراجعة و تصحيح المسار هام قدر حصولي علي درجة مرتفعة - إن لم تكن أفضل درجة - فهذا أهم جانب في عملية التقويم.
8	يمكن تشبيه الذكاء بالعضلات التي وفقا للمران إما أن تنمو أو تضمحل.							الذكاء فطري و موروث قد نتعلم أشياء جديدة لكن هذا لا يعني انه بالا مكان تغييره.
9	كل ما احتاجه لكي أنجح في مقرر ما أن ادرس ما يقوله المحاضر.							لا ينبغي أن أعتمد بالكامل علي المحاضر ذلك أن جزء من عملية التعلم تتطلب أن استخرج بعض الأمور بنفسي.
10	يجب أن يتحمل الطلاب بعض المسئولية ويكون لهم القرار فيما يتعلمونه وكيف يتعلموه وكيف يُقَوموا.							المحاضرون خبراء في مقرراتهم وإذا ما بدت الأمور غامضة وغير واضحة بالنسبة لي فذلك لأنهم يريدونني أن أفكر واعتمد على نفسي.
11	المحاضر الجيد هو من يتفادي الموضوعات التي يتوقع أن يجدها طلابه صعبة.							يجب أن يثير المحاضر في فصله التحدي والمثابرة بتقديم موضوعات صعبة.

12	ما يهم في الامتحان هو جودة الإجابة وليس كمها.							أتوقع أن أكافأ في الإمتحان كلما قدمت أو عرضت أكثر قدر ممكن من المعلومات.
13	يجب أن يمنح الطلاب الفرصة لمتابعة اهتماماتهم وميولهم في المحاضرة.							إذا ما أتيحت الفرصة للطلاب لممارسة اهتماماتهم خلال المحاضرة فإن الفصل الدراسي سينتهي بدون تعلم قدر كافي من المقرر.
14	لا أعتقد أن كل ما نتعلمه يمثل الحقيقة المطلقة، يجب أن يحاول الطلاب نقد ومناقشة المعرفة الموجودة.							ما نتعلمه يمثل مجموعة من التفسيرات للظواهر التي تحدث في الحياة وعلى الطلاب أن يكتفوا باستيعاب وحفظ هذه التفسيرات والمعلومات.
15	لا أحب مناقشات الطلاب وتعارض آرائهم فهذا يعني أنه لم يفهم أحد منهم ما يقوله المحاضر.							أحب أن يتناقش الطلاب وتتعدد آراؤهم فهذا يعني أنهم أكثر فهما.
16	لن أخطأ إذا ما تقبلت كل ما يقول المحاضر لأني إذا ما تساءلت عن كل شيء فقد يؤدي ذلك بي إلى الرسوب.							لا أعتقد بمجرد تقبل كل ما يقوله الحاضر بدون الاستفسار فالنجاح يتضمن التفكير لذاتي.
17	أثناء تعلمي لا أحب الواجبات أو المهام الغامضة وغير المحدد والتي لا يحدد فيها المحاضر ما المطلوب من تحقيقه على وجه الدقة وكيف أحققه.							أحب المهام التي لا يحدد المحاضر فيها بالضبط ما المطلوب مني ويبقى لي اتخاذ القرار تجاهها.
18	الذكاء يعني نسبة ذكاء مرتفعة(IQ) و أن تنجح في دراستك الجامعية.							الذكاء غير محدود بنسبة معينة (IQ) أو بالنجاح الأكاديمي.

الجزء الثاني: لكل مفردة من المفردات التالية، ضع علامة (√) في المربع الذي يعكس وجهة نظرك:

	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
(1) المحاضر المثالي هو من يميز الطالب المتفوق من غيره.	☐	☐	☐	☐	☐
(2) عندما أبدأ بدراسة مقرر جديد فإن أهم الأمور التي يجب أن أعرفها هي كيف تتم إجراءات التقييم لهذا المقرر.	☐	☐	☐	☐	☐
(3) اختلاف وجهات نظر المحاضرين قد تبدوا أحيانا مربكة لكني أجد ذلك مفيدا وممتعا جدا.	☐	☐	☐	☐	☐
(4) أجد العمل في مجموعات فرصة جيدة لمناقشة الأمور مع زملائي والاستماع لوجهة نظرهم، لكني على الرغم من ذلك أعتبر أن تعليق المحاضر النهائي أهم بكثير من ذلك.	☐	☐	☐	☐	☐
(5) إذا ما التزم المحاضرون بالمعلومات والحقائق التي يجب تدريسها وتوقفوا عن التنظير لأمكننا الاستفادة من محاضراتهم.	☐	☐	☐	☐	☐
(6) نعد أنا وزملائي مصدرا يمكن الاعتماد عليه في التقويم تماما كالمعلم.	☐	☐	☐	☐	☐
(7) ما يقدمه المحاضر من معلومات أو تلك المتضمنة بالكتاب أهم بكثير من الأنشطة الصفية التي تتطلب منا أن نفكر فيما نتعلمه وما نود أن نتعلمه.	☐	☐	☐	☐	☐
(8) أجد من المربك أن أواجه معلومات تتناقض عمّا أعرفه مسبقا.	☐	☐	☐	☐	☐
(9) وجهة نظر زملائي تعد أحيانا مهمة وناقدة وتستحق قدرا من التفكير أكثر من آراء المحاضر أو تلك المتضمنة بالمنهج المقرر.	☐	☐	☐	☐	☐

الرجاء كتابة تعليقاتك هنا:

أنا علي استعداد لإجراء مقابلة مع الباحثة: موافق☐ غير موافق☐

رجاء تحديد وسيلة يمكن بها الإتصال بك لاحقا: .....

شكرا جزيلا على حسن تعاونكم

كلية التربية - جامعة جلاسكو - المملكة المتحدة

التعليم و التعلم
(نسخة المعلم)

الاستبيان الذي بين يديك هو جزء من دراسة تهدف التعرف علي وجهات نظرك عن عملية التعليم و التعلم، وتجدر الإشارة هنا إلي أن إجاباتك سوف تعامل بسرية تامة ولن تستخدم إلا لأغراض البحث العلمي.

إسم المدرسة: ..... . (اختياري) الإسم: ..... (اختياري)

الجنس: ذكر ☐ أنثى ☐

افرقة: إبتدائي ☐ إعدادي ☐ ثانوي ☐

عدد سنوات التدريس: 1-5 ☐ 6-10 ☐ 11-15 ☐ أكثر من ذلك ☐

الجزء الأول: سيتم في السؤال القادم عرض أزواج من العبارات مع وجود ستة صناديق بينها، يمكنك عن طريق وضع (√) في **أحد** هذه الصناديق الستة أن توضح مع أي عبارة تتفق و إلي أي مدي تتفق معها، وذلك كما في المثال التالي:

تدل العلامات الموجودة على أنك تعتقد أن عربة السباق سريعة جدا جدا، وبالرغم من أنها ليست على درجة كبيرة من الأهمية إلا أنك تعتبرها مهمة عن كونها غير مهمة، وكذلك أنها خطيرة بدرجة كبيرة.

بطيئة	☐	☐	☐	☐	☐	☑	سريعة
غير مهمة	☐	☐	☐	☐	☑	☐	مهمة
خطيرة	☐	☑	☐	☐	☐	☐	امنة

الآن ضع علامة (√) في الصندوق الذي يمثل وجهه نظرك مع مراعاة وضع علامة واحدة فقط لكل سؤال:

1	مهمة الطالب في الامتحان هي إجابة الأسئلة مستعينة بالمعلومات التي درسها بالإضافة إلي تلك التي اكتسبها من خلال قراءاته.							مهمة الطالب في الامتحان هي استرجاع المعلومات التي درسها في أي مادة مراعيا الدقة قدر المستطاع.
2	كل ما ينبغي علي الطالب عمله في المذاكرة هو حفظ الأشياء مهتما بالتفاصيل.							بدلا من الاقتصار علي الحفظ فإنه يجب علي الطالب أن يبحث عن منظومات و علاقات بين المعلومات مهتما بالفكرة العامة وراء كل شئ.
3	إذا كنت ذكي فبإمكانك أن تفعل أشياء عديدة بكفاءة.							الذكاء يتضمن أشياء مختلفة، فقد تكون جيد في شئ و سيء في شئ آخر.
4	في تصميم الإمتحانات أفضل الأسئلة التي تتطلب إجابات قصيرة والتي تعتمد علي المقرر بشكل أساسي.							أجد الأسئلة التي تتطلب إجابات قصيرة غير مفيدة، فهي لا تعطي الطالب فرصة لشرح ما يعرفه و إظهار قدرته علي التفكير.
5	أعتقد أن المعلم الجيد هو من يعرض وجهات النظر المختلفة لأي قضية يدرسها، و علي الطالب أن يأخذ الفرصة للنقد و اختيار ما يستطيع تدعيمه بالبرهان و المنطق.							المعلم الجيد هو الذي يحدد لتلاميذه وجهة النظر المتفق عليها في أي موضوع يدرسه أو علي الأقل يحدد الرأي الذي يفضله أو يحبذه هو شخصيا.
6	المعرفة معقدة وليست بأي حال ابيض أو اسود، صواب أو خطأ. أجد ذلك ممتعا وشيقا فهو يدفعني لمعرفة واكتشاف المزيد بنفسي.							المعرفة مجموعة من الحقائق التي إما ابيض أو اسود، صواب أو خطأ. لا أحب الغموض و عدم اليقين.
7	لا يمثل الامتحان بالنسبة لطلابي موقف تهديد، اعتبره فرصة للمراجعة و تصحيح المسار و تحسين كلا من عملية التدريس و التعلم.							لا اعتبر المراجعة و تصحيح المسار هام قدر حصول طلابي علي درجات مرتفعة - إن لم تكن أفضل درجات - فهذا أهم جانب في عملية التقويم.
8	يمكن تشبيه الذكاء بالعضلات التي وفقا للمران إما أن تنمو او تضمحل.							الذكاء فطري و موروث قد نتعلم أشياء جديدة لكن هذا لا يعني انه بالا مكان تغييره.
9	كل ما يحتاجه الطلاب لكي ينجحوا في مقرر ما أن يدرسوا ما يقوله المعلم.							لا ينبغي علي الطلاب أن يعتمدوا بالكامل علي المعلم ذلك أن جزء من عملية التعلم تتطلب أن يستخرجوا بعض الأمور بأنفسهم.
10	يجب أن يتحمل الطلاب بعض المسئولية ويكون لهم القرار فيما يتعلمونه وكيف يتعلموه وكيف يُقَوموا.							المحاضرون خبراء في مقرراتهم وإذا ما بدت الأمور غامضة وغير واضحة بالنسبة للطلاب فذلك لأنهم يريدونهم أن يفكروا ويعتمدوا على أنفسهم.
11	المعلم الجيد هو من يتفادي الموضوعات التي يتوقع أن يجدها طلابه صعبة.							يجب أن يثير المعلم في فصله التحدي والمثابرة بتقديم موضوعات صعبة.
12	ما يهم في الامتحان هو جودة الإجابة وليس كمها.							أكافأ في الإمتحان الطلاب كلما قدموا أو عرضوا أكثر قدر ممكن من المعلومات.

13	يجب أن يمنح الطلاب الفرصة لمتابعة اهتماماتهم وميولهم في المحاضرة.							إذا ما أتيحت الفرصة للطلاب لممارسة اهتماماتهم خلال المحاضرة فإن الفصل الدراسي سينتهي بدون تعلم قدر كافي من المقرر.
14	لا أعتقد أن كل ما ندرسه يمثل الحقيقة المطلقة، يجب أن يحاول الطلاب نقد ومناقشة المعرفة الموجودة.							ما ندرسه يمثل مجموعة من التفسيرات للظواهر التي تحدث في الحياة وعلى الطلاب أن يكتفوا باستيعاب وحفظ هذه التفسيرات والمعلومات.
15	لا أحب مناقشات الطلاب وتعارض آرائهم فهذا يعني أنه لم يفهم أحد منهم ما أقوله.							أحب أن يتناقش الطلاب وتتعدد آراؤهم فهذا يعني أنهم أكثر فهما.
16	لن يخطئ الطلاب إذا ما تقبلوا كل ما يقوله المعلم، إذا ما تساءلوا عن كل شيء فقد يؤدي ذلك بهم إلى الرسوب.							لا أعتقد بمجرد تقبل الطلاب لكل ما يقوله المعلم بدون الاستفسار فالنجاح يتضمن التفكير الذاتي.
17	لا أحب الواجبات أو المهام الغير المحددة التي لا أحدد فيها ما المطلوب من طلابي تحقيقه على وجه الدقة وكيف لهم ان يحققونه.							أحب المهام التي لا أحدد فيها بالضبط ما المطلوب من طلابي ويبقى لهم اتخاذ القرار تجاهها.
18	الذكاء يعني نسبة ذكاء مرتفعة(IQ) و أن تنجح في دراستك الجامعية.							الذكاء غير محدود بنسبة معينة (IQ) أو بالنجاح الأكاديمي.

الجزء الثاني: لكل مفردة من المفردات التالية، ضع علامة (√) في المربع الذي يعكس وجهة نظرك:

		موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
(1)	المحاضر المثالي هو من يميز الطالب المتفوق من غيره.	☐	☐	☐	☐	☐
(2)	عندما أبدأ بدراسة مقرر جديد فإن أهم الأمور التي يجب أن يعرفها طلابي هي كيف تتم إجراءات التقييم لهذا المقرر.	☐	☐	☐	☐	☐
(3)	اختلاف وجهات نظر المعلمين قد تبدوا أحيانا مربكة لكني أجد ذلك مفيدا وممتعا جدا.	☐	☐	☐	☐	☐
(4)	أجد العمل في مجموعات فرصة جيدة لمناقشة طلابي للأمور مع زملائهم والاستماع لوجهة نظرهم، لكني على الرغم من ذلك أعتبر أن ما يوجد بالكتاب المقرر أهم بكثير من ذلك.	☐	☐	☐	☐	☐
(5)	إذا ما التزم المعلمون بالمعلومات والحقائق التي يجب تدريسها وتوقفوا عن التنظير لأمكن طلابهم الاستفادة من دروسهم.	☐	☐	☐	☐	☐
(6)	يعد طلابي مصدرا يمكن الاعتماد عليه في التقويم تماما كالمعلم.	☐	☐	☐	☐	☐
(7)	ما يقدمه المعلم من معلومات أو تلك المتضمنة بالكتاب أهم بكثير من الأنشطة الصفية التي تتطلب من الطلاب أن يفكروا فيما تعلموه وما يود أن يتعلموه.	☐	☐	☐	☐	☐
(8)	أجد من المربك أن أواجه معلومات تتناقض عمّا أعرفه مسبقا.	☐	☐	☐	☐	☐
(9)	وجهة نظر طلابي تعد أحيانا مهمة وناقدة وتستحق قدرا من التفكير أكثر من آراء المعلم أو تلك المتضمنة بالمنهج المقرر.	☐	☐	☐	☐	☐

الرجاء كتابة تعليقاتك هنا:

أنا علي استعداد لإجراء مقابلة مع الباحثة: موافق☐ غير موافق☐

رجاء تحديد وسيلة يمكن بها الإتصال بك لاحقا: .....

شكرا جزيلا على حسن تعاونكم

كلية التربية - جامعة جلاسكو - المملكة المتحدة

The Centre for Science Education

Director: Dr Norman Reid, BSc, MA, PhD, FRSA, FRSC
Telephone: 0141-330-5172
Fax: 0141-330-3755
E-Mail: N.Reid@mis.gla.ac.uk

UNIVERSITY *of* GLASGOW

15th January, 2004

To Whom it May Concern

I write to confirm that Mrs Mona El-Sawaf is a matriculated student (0218112) at the University of Glasgow studying for her PhD.

As part of her work, she is planning to use questionnaires with students undertaking degrees in preparation for teaching along with some practising teachers; and to conduct a series of interviews with a sample from both groups.

I hope you can offer assistance in making this possible.

Thank you

The Centre for Science Education, University of Glasgow
St Andrews Building, 11 Eldon Street, Glasgow, G3 6NH, SCOTLAND
Director: Dr Norman Reid: 0141-330-5172
Professor Rex R Whitehead: 0141-330-2022
Emeritus Professor: Professor A. H. Johnstone
Telephone: 0141-330-5172 Fax: 0141-330-3755
Web Site: http://www.gla.ac.uk/centres/scienceeducation

جامعة عين شمس

كلية البنات

قسم علم النفس

لمن يهمة الامـــر

نحيط سيادتكم علما بان الباحثه / منى محمد فؤاد الصواف المعيدة بقسم علم النفس بكلية البنات بجامعة عين شمس ، هى الان عضو البعثه الخارجية بكلية التربية جامعة جلاسكو باسكتلندا ، وتقوم باعداد رسالتها للحصول على درجة الدكتوراه فى التربية بعنوان < ادراك الطالب المعلم ، والمعلم للعملية التعليمية > دراسه مقارنه بين المجتمع المصرى والمجتمع الاسكتلندى .. وذلك بناء على موافقه الاستاذ الدكتورالمشرف الاجنبى بان تقوم الباحثه بتطبيق الجزء العملى فى الجامعات والمدارس المصرية ..

برجاء التكرم بالموافقة على التعاون فىتحقيق هذا الهدف ...

ولسيادتكم جزيل الشكر على حسن تعاونكم معنا .....

<<<<< وتفضلوا بقبول فائق الاحترام >>>>>

رئيس قسم علم النفـس

ا.د. حمدى محمد ياسين

Chi-Square Test (χ^2)[1]

Chi-square is a non-parametrical test used for statistical data analysis. It is used to explore the relationship between two or more categorical variables. There are two distinct applications of chi-square: goodness of fit test and contingency test. Both are employed in the present study.

(1) Goodness of Fit Test

In this test, an experimental observed array of responses is compared to a hypothesised control array of responses. In other words, this test is used to determine if the observed frequencies are different from the hypothesised control ones. In the current study, undergraduates in their first year were considered the control group to which undergraduates in their subsequent years were compared. An example of this is presented next.

	Positive	Neutral	Negative	*Total N*
Experimental	55	95	23	173
Control	34	100	43	177

A calculation of observed and expected frequencies lead to:

fo = observed frequency	55	95	23
fe = expected frequency	33.2	97.7	42

Where *fe* = [N(experimental) / N(control)] X (control data)] that is (173/177) X (control data)

To get a χ^2 value, the following calculation is to be considered.

$$X^2 = \Sigma \frac{(\text{Observed frequencies} - \text{Expected frequencies})^2}{\text{Expected frequencies}}$$

$$= \Sigma \frac{(Fo - Fe)^2}{Fe}$$

$$\chi^2 = \frac{(55 - 33.2)^2}{33.2} + \frac{(95 - 97.7)^2}{97.7} + \frac{(23 - 42)^2}{42}$$

$$\chi^2 = 22.98$$

At two degrees of freedom (*df*), this is significant at less than 0.1 (χ^2 critical at 1% level= 9.21).

[1] Information presented here is referenced to Reid, N. (1978). *Attitude development through a science curriculum.* Unpublished doctoral dissertation, University of Glasgow, Glasgow.

(2) Contingency Test

In this test, two observed frequencies are being compared. There is no reason to suppose either is a control. Chi-square as a contingency test is used to compare two or more independent variables such as, year groups, gender or years of teaching experience. In the current study it was used to compare the teachers groups with the groups of undergraduates and post-graduates.

	Positive	Neutral	Negative	*Total N*
Male (experimental) *fo*	55	95	23	**173**
Female (experimental) *fo*	34	100	43	**177**

Male (experimental) *fe*	**(44)**	**(96)**	**(33)**	
Female (experimental) *fe*	**(45)**	**(97)**	**(33)**	
Total N	**89**	**195**	**66**	**350**

Expected frequencies (*fe*) are shown above in brackets. They are calculated as follows:

(137/350) X 89 = 44

$$\chi^2 = \frac{(55-44)^2}{44} + \frac{(95-96)^2}{96} + \frac{(23-33)^2}{33} + \frac{(100-97)^2}{97} + \frac{(43-33)^2}{33}$$

$$\chi^2 = 2.75 + 0.01 + 3.03 + 2.69 + 0.09 + 3.03$$

$$\chi^2 = 11.60$$

At two degrees of freedom, this value of χ^2 is significant at less than 0.1 (χ^2 critical at 1% level = 9.21).

(3) Degrees of freedom

The degree of freedom (df) is the number of independent pieces of information that go into the estimate of a parameter. A parameter is a numerical quantity measuring some aspect of a population of scores)[2]. In general, the degrees of freedom of an estimate must be stated for any calculated chi-square value. The value of the degree of freedom for any analysis is obtained from the following calculations:

$$df = (r-1) \times (c-1)$$

Where **r** refers to the number of rows and **c** refers to number of columns in the contingency table.

[2] From http://davidmlane.com/hyperstat/chi_square.html

(4) Significance levels

In hypothesis testing, the significance level is the criterion used for rejecting the null hypothesis. The significance level is used in hypothesis testing as follows: First, the difference between the results of the experiment and the null hypothesis is determined. Then, assuming the null hypothesis is true, the probability of a difference that large or larger is computed. Finally, this probability is compared to the significance level. If the probability is less than or equal to the significance level, then the null hypothesis is rejected and the outcome is said to be statistically significant. Traditionally, experimenters have used either the 0.05 level (sometimes called the 5% level) or the 0.01 level (1% level), although the choice of levels is largely subjective. The lower the significance level, the more the data must diverge from the null hypothesis to be significant. Therefore, the 0.01 level is more conservative than the 0.05 level and so are 0.005 and 0.001.[3]

(5) Limitation on the use of χ^2

It is assumed that the lowest expected frequency values in any cell within each category of chi-square table should be 5 or more. Some writers (e.g. Siegel, 1956) suggest if there are any values less than that, there is a chance that the calculation of χ^2 may occasionally produce inflated resulted. This may also lead to wrong interpretations. In order to avoid dubious conclusions, a 10% category limit was imposed. Employed in this process also is the grouping of some categories together.

[3] From http://davidmlane.com/hyperstat/A72117.html

Undergraduates' Interview Schedule

1. How would you describe your ideal learning environment?
2. Can you vision your role in it and describe it to me?
3. How would you like the learner's abilities to be perceived?
4. How would you like your teachers' role to be?
5. What role would your peers' have?
6. How would you like to be assessed?
7. What sources would you consider for obtaining knowledge?
8. When would you describe your university experiences as positive?
9. At this stage of your degree, how far are you from what you have portrayed as your ideal learning environment?
10. Can you tell me more about that?

The Interview Schedule of the Egyptian Teachers

(1) Comment on the following statement...

> Students should be given more responsibility in their learning, should have a say in what is to be taught, how it is to be taught and how it is to be assessed.

Do you think students have been given too much or too less responsibility? Why?

How do you accommodate students' interests and needs, if you wish to, in your lesson planning and classroom teaching? Please give examples.

In your opinion, what do you think could help you more to implement what you believe in?

(2) Comment on the following statement...

> Working in groups is a good opportunity for students to discuss things together and to listen to different viewpoints. It is as important as the textbook.

Do you think students have been given enough opportunities to work and learn co-operatively? Why?

How do you accommodate peer learning in your lesson planning and classroom teaching? Please give examples.

In your opinion, what do you think could help you more to implement what you believe in?

(3) Comment on the following statement...

> Intelligence is something like a muscle that can – given the right circumstances – develop or shrink. It is the mission of education to help students fulfil their potential.

Do you think students have been offered the right circumstances to have their abilities developed?

What do you consider as the 'right circumstances' and how do you create such an environment in your classroom? Please give examples.

In your opinion, what do you think could help you more to make this possible?

(4) Comment on the following statement...

> Assessment of students' learning should not be a real threat. It is an opportunity for feedback and improvement of learning and teaching.

How do you assess your students' learning? Please give examples.

If you wish to have other approaches to assessment, what would that be?

How do you observe, monitor and assess your own teaching?

(4) Comment on the following statement...

> Knowledge is complex and by no means all black and white. This makes students want to explore things more for themselves.

Do you think students have been given enough opportunities to realise this?

How do you help students to realise and appreciate the complexity of knowledge?

In your opinion, what do you think could help you more to make this possible?

Background to the Egyptian Educational System[1]

For thousands of years Egypt has had a pioneering role in the progress of human civilisation. In ancient Egypt special interest was given to knowledge and education. This was evident in the development of Egyptian hieroglyphs around (about 3100 BC) as one of the early writing systems in the world.

In the modern era, Al-Azhar, established in 359 H (975 AD), was another significant contribution to human civilisation. It was the worldwide Islamic establishment that was primarily dedicated to teaching Islamic religion and studying Quran. Al-Azhar mosque was in actual reality functioning as an educational establishment. It was famous for the significant contributions the scholars of different schools of thought had provided to develop all of the theoretical sciences.

The development of the modern Egyptian education is, however, traced back to Mohammad Ali, an Ottman viceroy appointed to be the reign of Egypt in 1805. He introduced an educational system that, to this day, follows the European pattern. He established high schools in 1816, preparatory schools in 1825 and primary schools in 1832. In addition, he gave due attention to the stage of higher education introducing specialised schools of medicine, engineering, and languages. This was a significant move away from the religious and philosophical emphasis that had previously been dominant in Egyptian education.

During the nineteenth century, education was the centre of attention. Thanks to the efforts of Refa'a at-Tahtawy (1801 – 1873) and Ali Mubarak (1824 – 1893), the pioneers of the Egyptian modern education, missions were sent to Europe, a national library was built (i.e. Darul-Kutub in 1970), teachers' college was established (i.e. Darul-Ulum in 1880) and the Private University was inaugurated in 1908.

The twentieth century saw the introduction of compulsory education for all. The 1923 Constitution stipulated that primary education was to be obligatory to all Egyptians: male and females. A law-decree (issued in 1925) provided for the establishment of a government university under the name of 'Egyptian University', then comprising four faculties: Arts, Sciences, Medicine and law. In later years, in addition to Al-Azhar University (1930), further national universities were established: Alexandria University (1942), Ain Sham

[1] The historical information presented here are referenced to the following websites:

http://www.bc.edu/bc_org/avp/soc/cihe/inhea/profiles/Egypt.htm,

http://www.carnegieendowment.org,

http://countrystudies.us/egypt/71.htm,

http://www.sis.gov.eg,

http://www.photius.com/countries/egypt/society/egypt_society_education.html.

http://www.worldbank.org/mdf/mdf4/papers/galal.pdf,

http://weekly.ahram.org.eg/2005/727/intrvw.htm,

http://www.photius.com/countries/egypt/society/egypt_society_education.html.

University (1950) and Assiut University (1975). Provisional universities were later established.

Taha Hussein (1889 – 1973) with his famous statement 'education is like water and air: a right to every human' gave due attention to education development and free education. After the 23rd July Revolution of 1952, the State introduced the 'democracy of education' principle which gave all citizens free access to education at all stages. The efforts of the subsequent governments of the twentieth century had been focussed on achieving the equity of educational opportunities for all. This had been manifested in investments to provide the basic requirements and the needed infrastructure. These endeavours were challenging because of the need to narrow the social gap between the rural and urban areas. Much of the effort was dedicated also to raising the awareness of the importance and necessity of education especially in the education of girls.

However, during the second half of the 20th century, Egypt's economy was over burdened by three wars (1956, 1967, 1973) that exhausted the greater part of its economic resources. The sector of education amongst many others had suffered the drawbacks as public investments in new educational infrastructure declined significantly.

Since the end of the wars, socio-economic reform plans have been the main agenda of the successive government. Education has been a major strand of this development. From 1981 to 2006, there has been major investment in education; enormous budget was specified to educational development and frequent educational reforms have been introduced. Representing the government, President Mubarak declared that education was the first national project to face the challenges of the future. A seminal document 'Mubarak and Education: A future outlook' (1992) was issued. It contained the perceptions of the current Egyptian education system and an outline of the new educational policies. It suggested the existence of a crisis in education. Schooling, according to this paper, was dependent upon 'memorisation and repetition' as opposed to a form of education in which children would be 'active partners'. The emphasis on rote learning had 'produced individuals who are easily programmable and vulnerable' and this had led to many social problems, including 'extremism and fanaticism' (McBride, n.d.).

Following the publication of this document, a series of national conferences were held to upgrade education. Conferences to update primary education (1993), preparatory education (1994), teacher education and training (1996) as well as a national conference for talented people (2000) were held. These conferences were aimed at creating a collective vision about the development of education.

Despite substantial improvements, one of the most apparent shortcomings of the system is its inability to produce an appropriate balance between equity and quality. The rapid expansion of access to education to include a burgeoning population, females and those in rural areas has been accomplished at the expenses of quality. There is wide consensus among educators (Jarrar & Massialas, 1992; Tawila, Lloyd, Bensch, & Wassef, 2000) and

economists (Bartsch, 1995; Fergany, 1998) that Egyptian schools perform poorly even when compared to that of other developing countries (Birdsall & O'Connel, 1999).

Despite the heavy investment, the Egyptian educational system has remained unchanged. The Egyptian national curriculum is very full, assessment is heavily dependent on formal summative examinations and the resources are limited. Teachers are inspected frequently having to produce written evidence of detailed lesson planning. They are appointed regionally, rather than at school level, and institutional hierarchies in school and educational authorities tend to be steep and entrenched (McBride, n.d.; Warschauer, 2003). Large class sizes; poorly trained teachers with low wages and status and a centralised test-driven curriculum focusing on rote memorisation of unimportant material have been identified as key problems areas (Jarrar & Massialas, 1992; Mubarak, 1993; Tawila et al., 2000).

It is these broader problems that have not been seriously addressed (Warschauer, 2003). Rather, in a bid to overcome two great divides (the international and the domestic) the government recently has invested heavily to integrate new technologies in schools and universities. At the international level, technology is seen as a way of catching up with the West (Bahaa El Din, 1997; Mubarak, 1999). At the domestic level, it is seen as a way to narrow the gap between the country's elite (almost all of whom live in the principal cities of Cairo and Alexandria) and its poor who are spread out in urban and rural areas across the nation (especially in remote communities of Upper Egypt) through the use of the Internet and satellite television for distance education. Warschauer (2003) has provided a three-year longitudinal evaluation of this newly adopted educational policy. In his evaluation, he confirmed the dysfunctionality of the Egyptian educational system and criticised the limited view of change, based on a top down solutions, that is mainly defined by the provision of equipment.

Indeed, the attention given to reform was piecemeal and lacked vision. A vision of the quality of the education provided in the Egyptian education was outlined only in 2002/2003 (see appendix 11.2) to respond to questions such as what educational quality is to be propagated in the formation of the Egyptian citizens of the present and the future. This vision identified the outcomes for education; the curriculum required to achieve those outcomes; the kind of teachers needed to develop and mediate the curriculum for learners; the kinds of schools required to enhance such learning for all children; the degree of parent support and community participation needed and finally the ways in which educational management can provide the leadership required to support school based reform. Although the vision is still new and not yet well rooted, it is characterised by a holistic and integrated approach to reform.

Comprehensive quality assurance is considered as one of the recent approaches the governments adopt to achieve reform. As an administration philosophy, it aims to realise competence in school performance. To achieve this, the national project for setting national criteria for education was established (September 2003). Moreover, the national authority

for guaranteeing education quality was established so as to carry out comprehensive evaluation for the educational institutions.

A report evaluating the government's new policies as reflected in schools reality is not published yet. However, it is worth noting that such policies being depicted in the words of politicians are recent matters. Subsequently, the manifestations of these policies to realise the government's vision in everyday school is still a challenging and questionable matter.

The Vision of Pre-University Education in Egypt

The vision of pre-university education set by the Egyptian government (recently outlined in 2002/2003) is based on six basic dimensions:

- Effective schooling that provide high quality education for every learner through learning environments that are not traditional, are student-centred, are based on active learning approaches and techniques. The use of information technology to provide students with self-learning skills, scientific learning skills, critical thinking skills and life skills.

- Distinguished teachers with high professional standards and experiences that enable them to be leading educators, good planners and self-reflective. They should be able to be effective contributors of change and development.

- Active learning-based curricula that are based on the needs of the community. Curricula should support students' critical scientific thinking, problem solving, lifelong learning and citizenship in this information age.

- Advanced teaching technologies that integrate with the teaching process (curriculum, textbooks, school administration, and educational system).

- School and community partnership that enhance education quality through the active participation in the community. The aim is to create a sharing culture of building a democratic society governed by the national policy of decentralisation.

- A distinguished educational administration that is based on information transparency, and accountability with responsible leaders who are aware of the reformation vision framed by the decentralisation policy.

Thinking, Learning and Teaching

Pupils see the world and interpret experiences from different perspectives. Some view it from a fairly 'black and white' standpoint while others appreciate the relative nature of knowledge and values and are seeking to formulate and affirm their own commitments. The aim of this questionnaire is to investigate your perceptions of the educational system and the development of pupils' 'intellectual and ethical development'.

What helps or hinders in making that possible?

Name: .....*(Optional)* School Name: ..... *(Optional)*

Sex: Male ☐ Female ☐

Level of Teaching: Primary ☐ Secondary ☐ Other ☐

How long (in years) have you been teaching? 1-5 ☐ 6-10 ☐ 11-15 ☐ More than that ☐

Please answer the questions as to how things **ARE** in the actual reality of schools **NOT** as how they **SHOULD BE.**

(Diagnosis not evaluation is the aim of this questionnaire)

Part I Questions:

(Q 1) *In my classroom teaching...*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I have a clear plan about developing the thinking of pupils.					
I am aware of the prerequisites needed to develop the thinking of pupils.					
I find it difficult to address the different developmental stages of pupils.					
I feel confident in my ability to support pupils when I introduce new ideas to them.					
I do not find it easy to model consistently how to question things.					
I consistently encourage pupils to think of various points and answers to any issue.					
I did not receive good enough training to help me plan my lessons in a way that addresses thinking as well as content.					
I rarely discuss with my pupils how to make learning and teaching better.					
I rarely invite my colleague to attend my classes and help me reflect on my practices.					
I often give pupils the time and the chance to explain and analyse their thinking.					
I record (e.g. video or tape) some of my classes to go through my practices again.					
I consistently use language in a way that encourages my pupils to think.					
I help my pupils to understand that the ultimate goal of learning is the development of thinking.					

(Q 2) *The curriculum I'm given...*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
is designed in a way that provokes thinking.					
is flexible enough to give the teacher and the pupils the chance to pursue what was of interest.					
does not encourage pupils to see different points of views.					
does not include various thinking activities that engage pupils in the learning process.					
is designed around developing higher order thinking skills.					
takes individual differences into account.					
considers discovering more that covering.					
does not encourage pupils to connect and relate the different topics and different subjects.					
Includes a clear list of thinking skills the teacher should develop through teaching.					

(Q 3) *The assessment I'm asked to use....*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
often focuses on memory and rarely addresses higher order thinking skills.					
is designed to diagnose strength, development needs and next steps in learning.					
provides sufficient evidence of the efficacy of teachers in developing the thinking of pupils.					
Gives a clear basis for judging the intellectual development of pupils.					
is rarely a dynamic interactive part of the learning process.					
provides an adequate and fair tool to judge the progress and success of the school in achieving its goals.					

(Q 4) *My colleagues and I...*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
are overloaded with work that we rarely have time to talk about topics like thinking or development.					
share the same interest in how to motivate and create engaging learning experiences for pupils.					
Consider ourselves as learners.					
feel isolated in our classrooms and its demands.					
employ a wide variety of activities that are centred on the concept of developing pupils' thinking.					
are rarely engaged in discussions about how to develop the thinking of pupils.					
are keen to make our school a community of learners.					
encourage and support each other to experiment with new ideas in teaching.					

(Q 5) *The way my school is run....*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
encourages formal and informal discussions on how to develop pupils' thinking.					
does not approve of the concept of 'shared control and leadership'.					
encourages and supports the freedom of teachers to experiment with new ideas					
welcomes new ideas and experiments on educational reform.					
ensures that outside pressures of direction and accountability focus on developing the potentialities of teachers.					
rarely updates teachers with the recent research on teaching and learning.					
Decision-makers at a national level rarely welcome suggestions from teachers about educational reform.					
Supervisors' discussions focus on developing the thinking of pupils.					

Part II Questions

(Q1) You are keen to introduce new developments in your school but find that you face various obstacles.

*Look at the list below and tick the **three** that are the largest obstacles from your perspective.*

- ☐ Time
- ☐ Resources and equipment
- ☐ Motivating colleagues
- ☐ Exams requirements
- ☐ The need to cover the syllabus in the allocated time
- ☐ Class size
- ☐ Motivating pupils
- ☐ Freedom to experiment
- ☐ The need for more training
- ☐ Something else (specify) .....

(Q2) In your view which of the following people have the greatest control over educational change.

*Select the **two** most important.*

- ☐ Pupils
- ☐ Inspectors
- ☐ MSPs
- ☐ Teachers
- ☐ Curriculum designers
- ☐ The minister of education
- ☐ Head teachers
- ☐ Local authority staff
- ☐ Someone else (specify) .....

(Q3) Changes can be made in many areas of the educational system. Here is a list of some of these areas.

*Select the **two** that need change most.*

- ☐ Curriculum
- ☐ Assessment
- ☐ School organisation
- ☐ Staff attitudes
- ☐ Staff training
- ☐ Teaching methodology
- ☐ Someone else (specify) .....

(Q4) How hopeful are you of achieving educational reform?

Much ☐ Very slightly ☐ Not at all ☐

What encourages or holds up meaningful educational reform?

(6

(Q5) To what extent do you think you have fulfilled your latent potential a a teacher?

Much ☐ Very slightly ☐ Not at all ☐

Thank you for your cooperation

التفكيروالتعلم والتعليم

يدرك الطلاب العالم و يفسروا خبراتهم فيه من واقع رؤى متعددة. يراه البعض من وجهه نظر تمتاز بأحادية التفكير إما "أبيض أو اسود"،في حين أن البعض الأخر يرى فيه التعددية و يقدر فيه نسبية المعرفة والقيم، وهناك من يسعي إلي أن يعكس ذلك في صياغة وتأكيد إلتزاماته وأفعاله .
يهدف هذا الاستبيان الى معرفة آرائك في النظام التعليمي ونمو الطلاب فكريا واخلاقي.!
.ما الذي يجعل هذا ممكنا وما الذي يجعله مستحيلا ؟

إسم المدرسة: ..... . (اختياري) الإسم: ..... (اختياري)

الجنس: ذكر ☐ أنثى ☐

الفرقة: إبتدائي ☐ إعدادي ☐ ثانوي ☐

عدد سنوات التدريس: 1-5 ☐ 6-10 ☐ 11-15 ☐ أكثر من ذلك ☐

يعتبر هذا الاستبيان **أداة للتشخيص وليست للتقييم**، لذا نرجوالاجابة من منظور رؤيتك للواقع **كما هو وليس كما ينبغي** أن يكون في مدارسنا المصرية.

أثناء التدريس في الصف الدراسي	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
لدى خطة واضحة عن تنمية تفكير الطلاب.					
أعي بالمتطلبات اللازمة لتنمية تفكير الطلاب.					
أجد مخاطبة مختلف مراحل النمو التي يكون فيها الطلاب أمرًا صعبًا.					
أشعر بالثقة في قدرتي على مساندة طلابي عندما أقدم لهم افكارًا جديدة.					
أنّ أقدم نموذج المفكر المتساؤل دائمًا أمام طلابي ليس بالأمر السهل.					
دائمًا أشجع طلابي على التفكير في مختلف وجهات النظر الممكنة وطرح إجابات متعددة لأي قضية.					
لم ألقي التدريب الكافي علي أن أعد دروسي بطريقة تتعدى المحتوى الدراسي لتخاطب تفكير الطلاب.					
نادرًا ما أتناقش مع طلابي عن كيفية تحسين عملية التعليم والتعلم.					
نادرًا ما أدعو زملائي لحضور حصصى الدراسية ومساعدتي على نقد ممارساتي في التدريس.					
دائمًا أعطي طلابي الوقت والفرصة الكافية لتوضيح وتحليل أفكارهم.					
أسجل (بالفيديو – بالكاسيت- الخ) بعض حصصي الدراسية حتى أستطيع أن أراجع ممارساتي الصفية مرة اخرى.					
دائمًا استخدم المفردات والمصطلحات اللغوية بطريقة تهدف الي تشجيع الطلاب علي التفكير.					
أساعد طلابي علي ادراك أن الهدف النهائي من عملية التعلم هو تنمية التفكير.					

المنهج الدراسي الذي أقوم بتدريسه	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
مصمم بطريقة تدعو الطلاب للتفكير.					
يمتاز بالمرونة ليعطي كلا من المعلم والطلاب الفرصة لمواصلة دراسة ما قد يجدونه ممتعا.					
لا يشجع الطلاب على رؤية مختلف وجهات النظر.					
لا يتضمن أنشطة متنوعة تشجع الطلاب على الإنغماس في عملية التعلم.					
مصمم لتنمية مهارات التفكير العليا.					
يأخذ في الإعتبار بالفروق الفردية.					
يهتم بالإكتشاف أكثر من إهتمامه بتغطية المحتوى الدراسي المطلوب.					
لا يشجع الطلاب على الربط بين الموضوعات والمواد الدراسية المختلفة.					
يتضمن قائمة واضحة بمهارات التفكير التي يجب أن ينميها المعلم أثناء تدريسه.					

نظام الإمتحانات و التقويم المطلوب مني إستخدامه.....	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
يركز على الذاكرة ونادرًا ما يخاطب مهارات التفكير العليا.					
يهدف لتشخيص نقاط القوة و تحديد ما المطلوب تنميته وكذلك تحديد الخطوات اللاحقة في التعلم.					
يعتبر دليل واضح علي كفاءة المعلم في تنمية تفكير الطلاب.					
يعطي أساس واضح للحكم على مهارت الطلاب العقلية.					
نادراً ما يعتبر جزءاً ديناميا تفاعليا في عملية التعلم.					
يعتبر أداة عادلة ومناسبة للحكم على مدى تقدم ونجاح المدرسة في تحقيق أهدافها.					

من فضلك إقلب الصفحة

انا وزملائي في المدرسة.....	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
مُثقلين بمتطلبات التدريس الجمة لدرجة انه ليس لدينا اي وقت للتحدث عن موضوعات مثل تنمية التفكير.					
إهتماماتنا مشتركة بكيفية إثارة دافعية الطلاب وخلق خبرات تعليمية جذابة لهم.					
نعتبر أنفسنا متعلمين.					
نشعر بالعزلة في فصولنا الدراسية ومتطلباتها.					
نستخدم أنشطة متنوعة متمركزة حول مفهوم تنمية تفكير الطلاب.					
نادرًا ما نندمج في مناقشات حول كيفية تنمية تفكير الطلاب.					
حريصون على جعل المدرسة مجتمع من المتعلمين.					
ندعم ونساند بعضنا البعض علي أن نجرب أفكارًا جديدة في التدريس.					

الطريقة التي تدار بها مدرستي.....	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
تشجع الإدارة المناقشات الرسمية والغير رسمية عن كيفية تنمية التفكير.					
لا تعتد بمفهوم القيادة و الحكم المشترك.					
تشجع وتساند حرية المعلم في أن يجرب أفكاراً جديدة في التدريس.					
ترحب بالأفكار والتجارب الجديده التي تهدف الى الإصلاح التعليمي.					
تؤكد على أن أي ضغوط خارجية من التوجية أو التفتيش تهدف الى تنمية إمكانات المعلم.					
نادرًا ما تمد المعلم بالأبحاث الحديثة عن التعليم والتعلم.					
نادرًا ما يرحب متخذي القرار على المستوى القومي بإقتراحات المعلمين عن الإصلاح التعليمي.					
تدور مناقشات القائمين علي التوجية والتفتيش حول تنمية تفكير الطلاب.					

(2) انت حريص على أن تقدم خطط تطويرية جديدة في مدرستك لكن واجهتك عقبات متنوعة.

انظر الى القائمة التالية واختار **ثلاث** من أكبر العقبات التي تعتقد أنها قد تواجهك.

- ☐ حجم الفصل
- ☐ دافعية الطلاب
- ☐ حرية التجريب
- ☐ الحاجة الى مزيد من التدريب
- ☐ شيئ آخر *(أذكره من فضلك)*.....
- ☐ الوقت
- ☐ المصادر والاجهزة التعليمية
- ☐ دافعية الزملاء
- ☐ الامتحانات ومتطلباتها
- ☐ الحاجة الى تغطية المنهج في الوقت المحدد

(3) من وجهة نظرك: أي من الاشخاص التالية مواقعهم له التأثير الأكبر في إحداث تغيير وإصلاح في التعليم (إختر **إثنان** فقط).

- ☐ مدير المدرسة
- ☐ أعضاء السلطة المحلية
- ☐ شخص آخر(أذكره من فضلك) ... .
- ☐ المعلم
- ☐ مصمموا المناهج الدراسية
- ☐ وزير التربية والتعليم
- ☐ الطلاب
- ☐ المفتش
- ☐ أعضاء مجلس الشعب

(4) يمكن ان يحدث التغيير في مجالات متعددة في النظام التعليمي.

هذه قائمة ببعض هذه المجالات اختر **اثنان** منهم تعتقد أنهما في أمس الحاجة الى التغيير.

- ☐ المنهج الدراسي
- ☐ إتجاهات هيئة التدريس
- ☐ مجال آخر(أذكره من فضلك).... .....
- ☐ الإمتحانات وطرق التقويم
- ☐ تدريب هيئة التدريس
- ☐ النظام والبيئة المدرسية
- ☐ طرق التدريس

(5) ما مدى تفاؤلك بامكانية تحقيق إصلاح في التعليم.

☐ الى درجة كبيرة ☐ الى حد ما ☐ ليس على الاطلاق

ما الذي يشجع أو يعيق إصلاح تعليمي ذو جدوى ؟

(6) الى أي درجة تعتقد أنك حققت إمكاناتك الكامنة كمعلم.

☐ الى درجة كبيرة ☐ الى حد ما ☐ ليس على الاطلاق

نشكرلكم حسن تعاونكم